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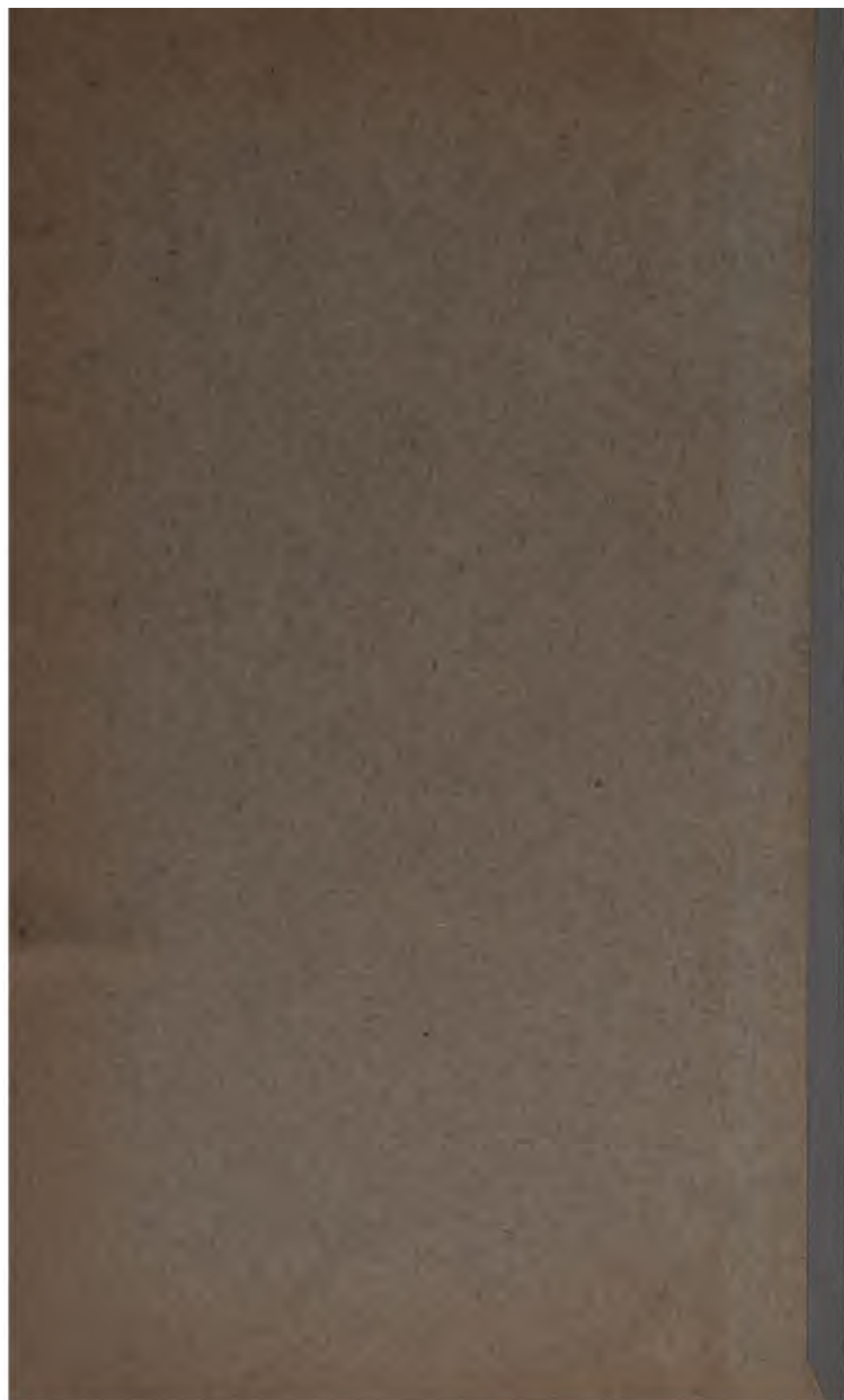
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REPORT
OF THE
OPERATIONS OF THE ENGINEER DEPARTMENT
OF THE
DISTRICT OF COLUMBIA

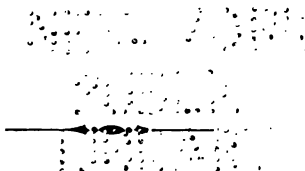
FOR
THE YEAR ENDING JUNE 30, 1898,

UNDER THE DIRECTION OF

MAJOR W. M. BLACK, CORPS OF ENGINEERS, U. S. A.,
ENGINEER COMMISSIONER, DISTRICT OF COLUMBIA,
From July 1, 1897, to May 31, 1898,

AND

CAPTAIN LANSING H. BEACH, CORPS OF ENGINEERS, U. S. A.,
ENGINEER COMMISSIONER, DISTRICT OF COLUMBIA,
From June 1, 1898.



WASHINGTON:
GOVERNMENT PRINTING OFFICE,
1898.



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**EXTRACT FROM THE REPORT OF THE COMMISSIONERS OF THE DISTRICT
OF COLUMBIA FOR THE YEAR ENDED JUNE 30, 1898.**

**OFFICE OF THE COMMISSIONERS
OF THE DISTRICT OF COLUMBIA,
*Washington, November 15, 1898.***

The PRESIDENT:

The Commissioners of the District of Columbia herewith submit for the information of Congress, as required by law, their annual report of the official doings of the government of said District for the fiscal year which ended June 30, 1898.

* * * * *

OPERATIONS OF THE ENGINEER DEPARTMENT.

The engineer department of the District of Columbia was under the charge of Maj. William M. Black, Corps of Engineers, U. S. A., from July 1, 1897, until May, 1898. He had as assistants Capt. Edward Burr, Corps of Engineers, U. S. A., and Capt. Lansing H. Beach, Corps of Engineers, U. S. A. Captain Burr was relieved from duty with the District of Columbia April 28, 1898, on account of the press of duties incident to the war with Spain, and shortly afterwards was ordered to the front. Major Black was also detailed to duty at the front, and from June 1, 1898, to the end of the fiscal year the department has been in charge of the present Engineer Commissioner, Capt. Lansing H. Beach.

STREET AND ALLEY PAVEMENTS.

Sheet asphalt and asphalt block were the only driveway pavements used upon the city streets during the year. Vitrified block was used almost entirely for alley paving, a few alleys being paved with asphalt block.

Fifty-five thousand six hundred and seventy-two square yards of new concrete pavement were laid, and 22,683 square yards of asphalt block pavement, and 30,393 square yards of old pavement were resurfaced, either by adding a coat of binder and surface material to the old material or removing the old material and laying a new surface with concrete base.

The old tar pavements which were laid a few years ago quite liberally throughout the city are beginning to fail very rapidly, and their general replacement can not be longer postponed. This pavement answers the purpose well during hot weather, but as soon as the temperature becomes low enough to cause the tar to become brittle it goes to pieces with but little more cohesion than so much loose gravel or broken stone. It will probably be necessary for Congress within the next two or three years to make a special appropriation for repaving these streets, or Washington will have to suffer the disgrace of having a good many disreputably paved streets within its limits. No resurfacing was done during the year over any other than tar pavement.

It is found upon further investigation that the statement in the last annual report of the engineer department that asphalt laid over granite block had not given satisfaction in this city is an erroneous one. The annexed table (p. XXII) shows the work that has been done in paving over concrete block, cobble, and other pavements, and the results obtained. The one pavement over granite block which has been unsatisfactory was of an experimental nature, no binder being used, and the wearing surface, with an extra amount of sand, being laid directly upon the blocks, and only $1\frac{1}{2}$ inches thick. This has worn badly, and a construction of this kind will not be repeated.

The annexed tables (p. IX) show the cost of repairs per square yard for sheet asphalt pavements upon 6-inch and 4-inch bases. No expense for repairs has been incurred for streets paved with asphalt block, although some will have to be repaired during the present season.

The present season has been particularly hot, without any intervening cool spells such as generally occur during the summer at this latitude. The result has been that the sheet asphalt has become thoroughly heated and softened, and has not had an opportunity for weeks at a time of hardening. Another inequality in the asphalt pavement is accentuated when the pavement becomes soft, and as a result of the extreme heat of the present summer the pavements of the city have become bumpy to a degree, it is believed, that has never occurred before.

In the report of last year the statement was made that asphalt block laid during hot weather gave better results than when laid during cold weather, as the block, being somewhat softened, the edges would mat, whereas, when laid in cold weather, the asphalt being brittle, the edges are liable to break or become rounded, and thus cause a somewhat noisier pavement. The manufacturer of the blocks admits that this occurred with the blocks as formerly made with limestone, but claims that by the use of granite or trap rock that breaking of the corners and edges is not so apt to occur. There has not been sufficient time to prove these claims, although experience to date seems to indicate that it is correct.

The prices for asphalt and asphalt block during the past year were: Sheet asphalt, \$1.54 to \$1.75 per square yard; asphalt block, \$1.77 per square yard. For the coming year the prices will be: Sheet asphalt, \$1.76 per square yard; asphalt block, \$1.77 per square yard.

Much complaint is made in the city against the granite-block pavement, and with very good reason. As described in the report of last year, this pavement is exceedingly slippery in dry weather and at all times excessively noisy. There is no questioning the fact that property interests are injuriously affected by this class of pavement. A residence facing a street of this character can not be rented for an amount equal to that freely given for a similar house upon a more smoothly paved street. The same can be said with regard to stores, with the additional fact that trade is to a certain extent diverted from such a street. The requests for relief from storekeepers and property owners throughout the city is general, and it is believed that it is time action should be taken in the matter. One great objection which has existed before to changing the character of these pavements has been that no use was provided in the plan for the blocks removed, and in this manner a large expense would be incurred and the cost of the blocks practically thrown away. Where there were so many streets in the city clamoring for pavement this argument had much force. It is now proposed, however, to utilize the granite blocks in diminishing the cost

of maintaining the county roads in the manner described under that head in this report.

It is earnestly recommended that the policy be inaugurated of removing such an amount of granite-block pavement from the streets of the city as Congress may consider the revenues will warrant, the street from which the blocks are removed to be provided with a sheet-asphalt or asphalt-block pavement. In this manner a great improvement could be made in city streets and county roads, and at a very slight cost over the price of a new pavement.

SIDEWALKS.

A greater amount of cement sidewalks was laid during the past year than ever before in the history of the city, the number of square yards being 62,796. The low price—89 cents per square yard—was taken advantage of by many citizens, and as the cost but little exceeded that of brick, a very small amount of the latter pavement was laid.

Cement sidewalks have been laid in the city 5 inches thick and without frost base. On account of the proximity of trees to the sidewalk, it is believed to be inadvisable to permit the use of cinders, and other material for forming a frost base becomes expensive. Experience has not shown that a frost base is necessary at this locality, as the ground generally is of such nature that the water does not remain immediately under the sidewalk, and spells of low temperature are not prolonged or severe. Only one instance is known within the past two years of a walk being thrown by frost, and that one was provided with a frost base, local conditions occurring under the walk, favoring the collection of water, causing the damage.

Several instances have occurred where walks have been broken by expansion during the hot weather of the present season and in this manner the heat appears to cause greater damage to the cement walks than the cold. A new cement sidewalk around the Congressional Library building was subjected to such compression by expansion that a couple of blocks were thrown into the air to a height of several feet, with a noise like the report of a gun, which brought people from the Library and stores in all directions in the vicinity. This is the only case known of explosive action due to expansion, but, as above stated, several instances are known of the gradual breaking up of the walk from this cause. Just what method is best adapted for protection against this trouble has not yet been determined. Flagstone costs much more than cement and does not appear to retain as good a surface. A brick walk is more expensive, unless laid directly upon sand, and when laid in this manner it is apt to lose its smooth surface during periods of alternate freezing and thawing; furthermore, it wears rapidly unless a class of brick is used which brings the cost above that of cement. The price of brick walk is from 75 to 80 cents per square yard, depending upon the distance which the bricks have to be hauled. The price for cement walk during the coming year is 98 cents per square yard without frost base and \$1.18 per square yard with frost base.

SUBURBAN STREETS AND COUNTY ROADS.

The District purchased a couple of steam road rollers during the year, and their use has given much satisfaction, as well as produced a general improvement in the roads upon which they were employed. The

District suffers greatly from the lack of good material for a wearing surface for macadamized roads. The gravel obtained from the river, when mixed with a little binder, gives an excellent result for a short while, but the material is not sufficiently hard to have good wearing qualities, and it is necessary to renew the surface very frequently if the road is kept in proper condition. Negotiations are now under way to secure a proper quality of trap rock, and it is hoped that if this material can be secured the work done upon the county roads will be more durable, and that considerable saving in cost of maintenance will result.

The appropriation for the coming fiscal year has been increased by Congress from \$40,000 to \$50,000, but even this larger sum is inadequate to secure results which should be obtained. There are 207 miles of suburban streets and county roads to be cared for from this appropriation, leaving the amount only \$241.54 per mile of road.

Several of the county roads—Seventh street, Bennings road, Bladensburg road, Nichols avenue, and, to a large extent, Canal road—have such a large traffic over them that macadam seems to be insufficient to stand the wear to which the road is subjected. It is recommended that the policy be inaugurated by Congress of taking granite blocks from the streets within the city and placing them upon the county roads. The roadway of these highways need not be over 30 feet wide, and if the granite block were used to pave the two outside thirds of the roadway—that is, a 10-foot strip on each side—it is believed that this portion of the road would be practically removed from the cost of maintenance. A 10-foot strip of asphalt or asphalt block laid down the middle third of the road would give a smooth driveway, and the cost of maintaining this third would be no greater per square yard than the cost of maintaining the same amount of macadam roadway. The cost of the construction of a roadway of this nature is estimated to be \$5 per linear foot, and the cost of sprinkling would also be saved. Take the Bladensburg road, for example: The cost of repairs has been 3.2 cents per square yard, and the cost of sprinkling 2 cents per square yard. If the roadway were constructed in the manner described, the cost of repairs would be nothing for five years, after which it would be about 3.2 cents per square yard per year; or, reducing it to a total for the road, the cost of repairs may be estimated to amount to \$1,452.80 per year; sprinkling, \$908 per year; total, \$2,360.80 per year; while the cost of maintenance under the construction proposed after the guarantee period of five years expired would probably be about \$484.27 per year.

The organic act providing for the present form of government of the District of Columbia states that all work costing over \$1,000 shall be done by contract, and it has been the interpretation of the office that the macadamizing of streets or county roads, if the cost of doing the work exceeded that amount, must be done by contract instead of by hired labor. The result has been far from satisfactory. None of the contractors who have done work for the District in recent years upon the county roads has possessed a road roller, so that the roads as constructed by them have lacked a proper degree of compaction for best construction. Furthermore, work done under contract requires under the law a five-year guarantee from the contractor, it being impossible during the guarantee period for the District to spend any money for repairs. The proper maintenance of a macadamized road is a matter of constant attention and repair. This it has been found impossible to obtain from the contractors, with the result that the roads frequently get in bad condition before the contractor can be brought to do anything upon them, and sometimes it is impossible to secure the results

desired, the amount retained under the contract being insufficient to do the work. Connecticut avenue extended is a notable example of this. Owing to these circumstances the policy has been inaugurated by the office during the past year of doing the grading and purchasing the material under contract, the stone being laid by District employees and compacted by the District road roller. Much better results have been secured in this manner, and as the cost of labor seldom runs to a thousand dollars, even upon the larger works, it is believed that the law is fully carried out. This feature is referred to in the report of Mr. C. B. Hunt, computing engineer (p. 3).

BRIDGES.

The appropriation for the ordinary construction and repairs of bridges has been for the past year and is for the coming year \$15,000, which is too small to serve the purposes for which it is intended.

The Navy-Yard Bridge is entirely inadequate to properly serve the travel which is required to pass over it. It should be replaced at an early date by a modern structure. Estimates for this work have been submitted to Congress for several years, but so far no results have been obtained.

STREET RAILWAYS.

The Brown underground electric system upon the Capital Railway Company's line on Eleventh and M streets SE. is still in an experimental stage, the company having changed the details of the contact boxes, but the last form adopted has been so recently introduced that its permanency is not assured.

Congress has authorized the reorganization of the Eckington and Soldiers' Home Railway Company and certain of its connecting lines, with the proviso that the portion in the city shall be converted into an underground system similar to that in use on the Metropolitan Railroad. It is hoped that this work will be promptly commenced, as the section of the city which depends upon this line for transit facilities is now suffering greatly for proper means of conveyance to and from the center of the city.

The power house which operated the cable of the Pennsylvania avenue and Fourteenth street lines of the Capital Traction Company was destroyed by fire September 29, 1897, and advantage was taken of this misfortune to change the method of propulsion from cable to underground electric, similar to the system in use on the Metropolitan Railroad. Horses were used to draw the cars during the period of changing the conduits to conform to the new system. After this work was done the Seventh street cable line, which was operated from another power house, was changed to the underground electric system without interfering with the operation of the cars, no temporary tracks whatever being used while the change was being made.

SEWERS.

The details of work done by the sewer department are shown in the report of the superintendent of sewers, Mr. D. E. McComb (p. 84).

Good progress has been made on the Tiber Creek and New Jersey avenue intercepting sewer, and appropriations have been made by Congress which fully enable the Commissioners to make contract for building this sewer to the point where it will intercept the present

Tiber Creek sewer. Appropriation has also been made for preparing plans for the pumping station, and it is hoped that rapid progress can henceforward be made on the sewage-disposal system. The necessity for the early completion of this system has been so fully told in former reports that it is believed unnecessary to repeat here the statements there made.

The question of doing away with the James Creek Canal has been agitated by the citizens of southeast Washington. This is a measure which should be carried out at the earliest possible moment. The only economical way of doing it, however, is believed to be in the prompt execution of the sewage-disposal works. Any other method of attempted relief would be only temporary and would be unnecessary if the sewage-disposal system is to be completed. An estimate has been made of the cost of constructing so much of the sewage-disposal system as will permit of the abolishment of this canal, which estimate is appended hereto (p. XXI).

The recommendation is again made that authority be secured, if possible, in cases where work is done under the continuous-contract system, to accept a bond from the contractor equal to each season's work separately, instead of a bond equal to the entire amount of the contract. It is believed that considerable saving to the District would result if this were done, as contractors will thus not be compelled to carry a heavy bond for several years when only small appropriations are made for each year's work. The District invariably has to pay the cost of carrying the bond.

PLUMBING.

The manner in which the work of this department is appreciated by the public is shown in the increased demand by citizens for the services of the office. This is distinctly shown in the report of the inspector of plumbing (p. 115), to which attention is invited.

The act recently passed by Congress establishing a plumbing board and making it unlawful for any person not a licensed plumber to engage in the plumbing business will do much toward preventing improper and careless work being done by irresponsible parties and will operate as a strong safeguard for the protection of occupants of dwellings throughout the city.

ASPHALT AND CEMENTS.

The details of the work done in this department are set forth in the report of Mr. A. W. Dow, inspector of asphalt and cements, to which attention is invited (p. 120).

PROPERTY.

This office was under the charge of Mr. L. T. Boiseau from the beginning of the fiscal year until June 16, 1898, when he left to enter the Army for service at the front as an officer of the First District of Columbia Volunteers. Since that date it has been in charge of Mr. C. T. Shoemaker.

WATER DEPARTMENT.

The condition of the water department, as will be seen from the report of the superintendent, Mr. W. A. McFarland, is much the same as it was during the preceding year. The supply system still suffers greatly

from waste, and attention is invited to the report of Mr. McFarland and the report of Mr. Green concerning the detection of this waste by means of a Deacon meter, and the amount of water wasted in the few instances mentioned. The case can not be better stated than has already been done by Captain Burr in his report of last year, and by Mr. McFarland in his report for this year, for which see page 134. Attention is respectfully invited to them, and the statements therein are fully approved by the Commissioners.

STREET LIGHTING.

The details of street lighting are stated in the accompanying report of Mr. W. C. Allen, inspector of electric lighting (p. 156).

The streets of Washington are extremely difficult to light satisfactorily during months when the trees are in leaf on account of the dense foliage, which prevents the light being thrown to any considerable distance. The electric lights are all provided with long arms reaching out into the street as far as consistent with safety, but even this is not satisfactory. The lights are of a thousand candlepower, which give a strong illumination, so strong in fact that it is the cause of constant complaint from the occupants of houses in close proximity, while at points between lamps the light is frequently so intercepted by the foliage as to render the lighting of the entire street very unsatisfactory. While the requirement of lamps of a thousand candlepower has heretofore been insisted on by Congress, it is believed that lights of less power placed closer together would give a much more satisfactory service, and as the cost of each individual light would be less than that of those now maintained, it is believed that no greater cost to the District would ensue.

The present law does not require the lamps to be lighted until forty-five minutes after sunset. This is believed to be too great an interval. Electric lights have been, until recently, used almost entirely upon the business streets, and the lights from stores have provided some illumination until the street lamps were lighted. With the increase in the number of electric lights and their establishment upon residence streets provided with heavy shade trees, it has been found that this service is entirely inadequate. The streets become inconveniently dark long before forty-five minutes after sunset, and upon cloudy evenings many of them well provided with shade trees become almost dangerous from the dense darkness. A schedule causing the lights to be started at fifteen minutes after sunset could, it is believed, be adopted without increased expense and to the great advantage of the public.

Congress has made an appropriation for experimental lighting, and experiments in this line will be conducted during the coming year to see whether it will be possible to provide a light between the gas lamp and the intensity of the electric light, which will do away with many or the inconveniences now existing.

BUILDING AND BUILDING INSPECTION.

Details of the work done in the office of the inspector of buildings will be found in the report of Mr. John B. Brady (p. 187). In this connection it should be stated that a marked improvement in the appearance of District buildings has been obtained by the employment of private architects to prepare the plans and specifications instead of having them drawn in the office of the inspector of buildings. That

official and his assistants have been and are so overcrowded with work that it is absolutely impossible for them to give the necessary time and attention to the preparation of detail plans to secure the best architectural features.

The Commissioners would renew their recommendation that appropriations be made for a definite number of schoolhouses, engine houses, or other municipal buildings, in an aggregate sum, leaving the amount to be allotted for each site and building to the discretion of the Commissioners. It is believed that in this way more favorable results can be secured.

SURVEYOR.

The work of this office is detailed in the appended report of Mr. W. P. Richards, surveyor (p. 195). The office was until May 18, 1898, under the charge of Mr. H. B. Looker, who resigned his position to enter the Army, commanding a company in the First District of Columbia Volunteers.

PARKING COMMISSION.

The work done by the parking commission is shown in the report, appended hereto, of Mr. Trueman Lanham, superintendent of parking (see p. 197).

The appropriations for several years past have been insufficient to keep in proper condition the trees in the various sections of the city, and which form one of the principal beauties of the national capital. The use of shade trees to the extent developed here, and the judicious care and control over them, is believed not to be equalled in any other city of the country, and the results are most gratifying. Many of the places of the 1,400 trees destroyed in the storm of September 29, 1896, still remain vacant, leaving ugly gaps in the rows, which should be filled at as early a date as possible in order to secure good results. It is earnestly hoped that an increased appropriation for this purpose can be obtained at the next session of Congress.

HIGHWAY EXTENSION PLANS.

The work done in this department is stated in detail in the appended report of Mr. W. P. Richards, engineer in charge (p. 200).

The highway act of 1893 has recently been amended by Congress so as to authorize a change in the plan of streets in the section between Rock Creek and the Soldiers' Home, and removing most of the features of the original act which were the cause of complaint of so many citizens of the District. It is believed that street extensions under the amended act will be generally satisfactory.

In conclusion, it is deemed only fitting to acknowledge the good work of the assistants and of the clerical force of the various departments of the office, who have not spared themselves in carrying out their duties to the best of their ability.

Very respectfully,

JOHN B. WIGHT,
JOHN W. ROSS,
LANSING H. BEACH,
Commissioners of the District of Columbia.

Asphalt pavement on 4-inch base.

Street.	From—	To—	Price per yard.	Year laid.	Square yards.	Original cost.	Cost of repairs per square yard per year after date of laying.					Contractor.
							6.	7.	8.	9.	10.	11.
A, NE	4th	7th	\$1.98	1887	4,205.84	\$10,610.08	0	.024	.018	.077	.026	Barber.
B, NE	6th	Mass. avenue	1.98	1887	2,250.24	3,223.33	.016	0	0	.037	.04	Do.
B, SE	6th	A. C. avenue	1.98	1887	2,250.24	7,812.97	0	.015	.06	.122	.149	Cranford.
C, SW	4 th	6th	1.97	1887	2,273.07	7,813.61	.037	.108	.158	.027	2.419	Do.
C, SW	1st.	4 th J. avenue	1.98	1887	2,273.07	12,063.95	0	0	0			Do.
C, NE	1st.	4 th J. avenue	2.00	1889	4,117.38	14,063.95	0	0	0			Do.
D, SE	Del. avenue	4 th	2.00	1887	2,362.61	7,063.47	0	.063	.112	.108	.045	Do.
D, SW	2d	4 th	1.99	1887	2,362.61	7,063.47	0	0	0	0		Do.
D, SW	2d	4 th	2.00	1889	2,362.61	12,453.88	0	0	0			Do.
E, NE	S. Capitol	1st.	2.00	1892	2,424.02	7,493.19						Barber.
E, NE	N. Capitol	1st.	2.08	1876	2,424.02	5,925.43	.003	.015	.013	.05	.04	Cranford.
E, NE	N. Capitol	4 th	1.97	1886	2,370.59	4,950.74	0	0	0	0	0	Do.
E, SW	2d	4 th	1.99	1887	1,580.45	4,950.74	0	0	0			Do.
E, SW	2d	4 th	2.00	1887	3,104.11	7,053.70	0	0				Do.
E, SW	S. Capitol	1st.	2.00	1880	3,104.11	7,053.70	0	0				Do.
E, SE	Pa. avenue	13th	1.90	1893-94	3,496.26	9,838.86						Do.
E, SE	Intersection of 13th.	13th	1.90	1894	619.91	1,640.76						Do.
F, NW	N. J. avenue	N. Capitol	1.98	1887	2,982.20	8,743.03	0	.02	.033	.119	.064	Barber.
F, NW	N. Capitol	3d	2.00	1888	8,892.19	13,706.89	0	.026	.051	.046		Cranford.
G, NW	N. J. avenue	N. Capitol	1.98	1887	3,802.29	12,800.12	0	.012	.08	.037		Barber.
G, NE	N. Capitol	1st.	2.00	1890	2,303.28	7,420.32	0	0				Do.
G, SW	2d	4 th	2.00	1888	2,475.65	5,259.13	0	.009	.065	0	0	Cranford.
H, NW	4th	7th	1.97	1887	19,044.30	19,044.30	.007	.015	.013	0	0	Do.
H, NE south side.	1st.	15th	2.00	1890	12,580.70	40,119.65	0	.001	.001			Barber.
H, SW	4th	3d	1.98	1887	4,077.37	8,947.54	.181	.10	.072	0	2.443	Cranford.
H, SW	1st.	3d	2.00	1889	4,111.00	12,254.88	0	0	.015			Do.
I, NE	N. Capitol	N. Capitol	2.00	1889	3,294.50	8,898.95	0	0	0			Do.
K, NE	1st.	1st.	2.00	1889	4,497.86	13,517.79	0	0	0			Do.
L, NW	26th	27th	2.00	1889	1,178.67	3,350.95	0	0	0			Do.
L, NW	N. J. avenue	N. Capitol	2.00	1890	4,643.35	13,997.49	0	0	0			Do.
M, NW	N. J. avenue	1st.	2.00	1890	2,597.37	6,710.58	0	0				Do.
N, NW	5th	N. J. avenue	2.00	1890	331.43	9,140.47	0	0				Do.
N, NW	21st.	22d	2.00	1892	2,081.21	6,366.15	0					Do.
N, NW	36th	37th	2.00	1891	1,080.61	4,009.48	0					Do.
O, NW	20th	21st	1.97	1887	2,010.97	5,131.08	0	.005	0		.008	Barber.
O, NW	35th	College gate.	2.00	1888	2,397.74	8,273.94	0	0	0	.05	0	Barber.
O, NW	21st.	22d	2.00	1889	2,398.13	6,965.56	.001	0	0			Cranford.

a Was replaced by 6-inch hydraulic base in 1893.

Asphalt pavement on 4-inch base—Continued.

Street.	From—	To—	Price per yard.	Year laid.	Square yards.	Original cost.	Cost of repairs per square yard per year after date of laying.					Contractor.	
							6.	7.	8.	9.	10.		11.
O. N.W.	28th	29th	\$2.00	1890	859.85	\$2,327.89	0	0	0	0	0	0	Barber.
Q. N.W.	30th	Valley	1.98	1887	3,943.37	11,551.35	0	0	0	0	.147	0	Do.
Q. N.W.	6th	R. I. avenue	1.98	1887	4,758.50	13,030.01	.039	.06	.014	.828	.10	0	Cranford.
Q. N.W.	17th	19th	2.00	1888	4,904.03	10,743.76	0	.0004	.034	.044	0	0	Do.
Q. N.W.	5th	N. J. avenue	2.00	1888	2,030.87	4,869.73	0	.009	.002	0	0	0	Do.
Q. N.W.	32d	N. Valley	1.98	1887	1,066.70	3,884.30	0	0	0	0	.063	0	Barber.
Q. N.W.	21st	22d	1.97	1886	2,541.39	5,631.17	0	0	.011	0	.27	.013	Cranford.
Q. N.W.	28th	30th	2.00	1889	2,000.00	6,607.67	0	0	0	0	0	0	Barber.
Q. N.W.	Vt. avenue	R. I. avenue	2.00	1889	2,453.44	6,077.14	0	0	0	0	0	0	Cranford.
Q. N.W.	3d	N. J. avenue	2.00	1890	1,812.10	6,517.51	0	0	0	0	0	0	Do.
Q. N.W.	5th	6th	2.00	1890	832.87	2,988.31	0	0	0	0	0	0	Do.
Q. N.W.	32d	35th	2.00	1891	4,001.98	14,136.01	0	0	0	0	0	0	Barber.
Q. N.W.	21st	Conn. avenue	1.98	1887	1,411.03	3,582.84	0	0	0	.063	.037	0	Cranford.
Q. N.W.	7th	9th	2.00	1888	1,601.82	4,061.99	0	0	.246	0	0	0	Do.
R. N.W.	16th	N. H. avenue	2.00	1890	3,018.20	14,872.75	0	0	0	0	0	0	Do.
R. N.W.	Fia. avenue	Lincoln	2.25	1890	3,060.88	6,101.76	0	0	0	0	0	0	Barber.
R. N.W.	Lincoln avenue	B. & O. R. R. b	2.00	1890	2,890.59	8,733.98	0	0	.027	0	0	0	Cranford.
S. N.W.	16th	S. N. H. avenue	2.00	1890	1,076.35	3,646.57	0	0	0	0	0	0	Do.
S. N.W.	20th	Conn. avenue	2.00	1889	5,058.40	14,526.02	0	.012	.017	0	0	0	Barber.
S. N.W.	7th	11th	2.00	1889	5,256.35	16,805.16	0	0	0	0	0	0	Cranford.
T. N.W.	10th	14th	2.00	1892	5,256.35	16,805.16	0	0	0	0	0	0	Barber.
U. N.W.	31st	32d	1.94	1895	3,738.87	11,415.38	0	0	0	0	0	0	Cranford.
U. N.W.	32d	35th	1.93	1894	2,371.13	8,261.82	0	0	0	0	0	0	Barber.
V. N.W.	13th	15th	1.53	1894	1,842.32	0	0	0	0	0	0	0	Cranford.
1st NW	I.	K	1.68	1890	1,190.82	3,028.37	0	0	0	0	0	0	Do.
1st NW	S	W	1.94	1895	7,385.28	0	0	0	0	0	0	0	Do.
1st NE	C	F	2.00	1891	5,616.24	13,995.46	0	0	0	0	0	0	Do.
2d NE	F	H	2.00	1891	3,884.92	9,595.23	0	0	0	0	0	0	Do.
2d SW	C	Va. avenue	2.00	1890	3,178.69	12,234.64	.009	.019	0	0	0	0	Do.
2d NE	C	T	2.00	1890	4,213.24	8,701.68	0	0	0	0	0	0	Do.
2d NE	C	F	2.00	1890	4,213.24	10,850.00	0	0	0	0	0	0	Do.
3d NE	C	F	2.00	1890	4,213.24	10,850.00	0	0	0	0	0	0	Do.
Mo. avenue	Pa. avenue	Mo. avenue	1.97	1886	2,286.83	6,208.92	0	.031	.041	.074	.15	.15	Do.
Mo. avenue	Mo. avenue	Md. avenue	2.00	1890	4,833.16	18,978.48	.047	.017	0	0	0	0	Do.
Q. N.W.	Q	Q	2.00	1889	3,122.98	7,764.19	0	.009	0	0	0	0	Barber.
Q. N.W.	Q	Q	2.00	1899	4,436.13	11,654.27	0	.021	.006	0	0	0	Cranford.
5th SE	E	E	1.93	1894	2,569.97	5,678.59	0	0	0	0	0	0	Barber.

b Laid for and at expense Geo. Truesdell.

6th, NW	G	N. Y. avenue	1.97	1887	6,896.22	17,992.06	.009	.01	.031	.089	.076	Cranford.
8th, NW	R	S	1.98	1887	2,063.20	5,220.57	.001	.004	.011	.07	.137	Do.
8th, NW	S	Fla. avenue	2.00	1888	3,623.84	8,937.31	0	0	0	0	0	Barber.
8th, SE	B	D	1.83	1894	4,764.65	17,992.37	0	0	0	0	0	Do.
9th, NE	H	H	2.00	1891	5,781.15	17,992.48	0	0	0	0	0	Do.
9th, NE	E	Capitol	2.00	1892	1,217.08	4,034.89	0	0	0	0	0	Do.
10th, NE	G	Mass. avenue	2.00	1892	2,060.89	6,813.56	.004	.034	0	.204	.016	Cranford.
10th, NW	R	S	1.98	1887	1,992.40	5,639.55	0	0	0	.003	0	Do.
12th, NW	R	S	2.00	1888	1,798.11	8,176.88	0	0	0	.045	.066	Do.
12th, NW	R	S	2.00	1888	2,394.00	8,119.88	.001	.018	.018	0	0	Do.
12th, NW	S	Vt. avenue	1.98	1887	5,377.15	18,872.61	0	0	0	0	0	Do.
12th, NW	S	V	2.00	1890	7,775.21	1,705.58	0	0	0	0	0	Do.
13th, NW	S	Intersection of R.	2.00	1889	7,775.21	4,401.44	0	0	0	0	0	Do.
13th, NE	Md. avenue	Emerson	2.00	1892	1,725.22	4,401.44	0	0	0	0	0	Do.
14th, NW	B	Pa. avenue	1.97	1887	8,851.74	23,511.87	.095	.501	.073	.132	.016	Barber.
14th, NW	Pa. avenue	Yale	2.00	1887	7,365.00	23,505.13	.008	.005	.003	0	0	Cranford.
17th, NW	P	R	1.98	1887	1,785.30	5,551.52	0	.013	.043	.105	.081	Barber.
17th, NW	Q	R	2.00	1889	1,874.24	6,154.05	.061	.028	0	0	0	Cranford.
17th, NW	Pa. avenue	N. Y. avenue	2.00	1889	4,847.07	12,684.10	0	0	0	0	0	Barber.
17th, NW	R	T	2.00	1889	2,946.33	10,430.38	.018	.017	0	0	0	Cranford.
18th, NW	P	Q	1.98	1887	1,763.70	5,896.88	0	.014	.022	.074	.018	Do.
18th, NW	Fla. avenue and Columbia road (widened).	Q	2.00	1891	3,206.32	6,412.14	0	0	0	0	0	Do.
21st, NW	Hillyer	R	2.00	1891	4,405.91	4,405.91	0	0	0	0	0	Do.
21st, NW	R	Fla. avenue	1.98	1887	988.15	2,708.34	0	.02	0	.145	.012	Do.
22d, NW	O	O	2.00	1890	1,483.01	5,186.91	0	0	0	0	0	Do.
22d, NW	M	Mass. avenue	2.00	1890	3,894.20	4,204.27	0	0	0	0	0	Do.
22d, NW	P	Mass. avenue	1.94	1896	2,668.50	6,482.82	0	0	0	0	0	Barber.
22d, NW	O	P	2.00	1889	1,585.70	4,861.67	.011	0	0	0	0	Cranford.
22d, NW	Mass. avenue	R	1.96	1896	2,137.67	4,785.03	0	0	0	0	0	Do.
25th, NW	Pa. avenue	M	2.00	1890	1,662.67	5,971.73	0	0	0	0	0	Do.
25th, NW	Pa. avenue	K	2.00	1890	1,163.37	4,146.22	0	0	0	0	0	Do.
28th, NW	P	P	2.00	1890	1,474.47	3,737.13	0	0	0	0	0	Do.
28th, NW	M	P	1.90	1894	1,560.78	3,737.13	0	0	0	0	0	Barber.
28th, NW	P	Q	1.10	1890	1,261.38	3,381.14	0	0	0	0	0	Thomas.
29th, NW	P	Q	2.00	1890	1,261.38	3,381.14	0	0	0	0	0	Barber.
30th, NW	P	Q	2.00	1888	1,262.00	3,514.60	0	0	0	0	0	Do.
31st, NW	K	M	1.98	1887	1,208.70	5,514.39	0	0	0	0	.015	Do.
33d, NW	M	N	2.00	1890	1,580.17	5,800.23	0	0	0	0	0	Do.
33d, NW	P	22d.	2.00	1890	4,674.58	9,781.00	0	0	0	0	0	Do.
34th, NW	M	N	2.00	1890	1,659.61	4,957.92	0	0	0	0	0	Do.
34th, NW	P	R	2.00	1891	2,264.00	8,483.90	0	0	0	0	0	Do.
34th, NW	N	R	2.00	1891	2,109.23	7,926.79	0	0	0	0	0	Do.
35th, NW	N	P	1.97	1887	2,929.23	8,163.70	0	.0004	0	0	.08	Cranford.
35th, NW	P	Prospect	1.97	1887	1,558.04	5,304.95	0	.012	.033	0	.114	Barber.
35th, NW	Q	U	2.00	1890	1,017.00	3,346.45	0	0	0	0	0	Do.
35th, NW	Q	U	2.00	1890	5,749.20	18,563.05	0	.002	0	0	0	Do.
36th, NW	Prospect	N. Capitol	2.00	1891	2,867.64	7,994.41	0	0	0	0	0	Do.
Mass. avenue	N. J. avenue	N. J. avenue	1.98	1887	5,143.20	14,178.99	0	.017	.039	.049	.038	Do.

Asphalt pavement on 4-inch base—Continued.

Street.	From—	To—	Price per yard.	Year laid.	Square yards.	Original cost.	Cost of repairs per square yard per year after date of laying.					Contractor.	
							6.	7.	8.	9.	10.		11.
O. NW.	28th	29th	\$2.00	1890	859.85	\$2,327.89	0	0					Barber.
Q. NW.	30th	Valley	1.98	1887	3,943.37	11,551.35	0	0	0	0	.147		Do.
Q. NW.	6th	R. I. avenue	1.98	1887	4,758.50	13,090.01	.039	.06	.014	.828	.10		Cranford.
Q. NW.	17th	19th	2.00	1888	4,904.03	10,743.76	0	.0004	.034	.044			Do.
Q. NW.	5th	N. J. avenue	2.00	1888	2,030.87	4,869.73	0	.009	.002				Do.
Q. NW.	32d	Valley	1.98	1887	1,065.70	3,884.30	0	0	0	0	.063		Do.
Q. NW.	21st	22d	1.97	1886	2,541.39	5,631.17	0	0	.011	0	.27	.013	Cranford.
Q. NW.	30th	R. I. avenue	2.00	1889	2,000.00	6,607.67	0	0	0	0			Barber.
Q. NW.	Vt. avenue	R. I. avenue	2.00	1889	2,453.44	6,077.14	0	0	0	0			Barber.
Q. NW.	3d	N. J. avenue	2.00	1890	1,812.10	6,517.51	0	0	0	0			Cranford.
Q. NW.	5th	6th	2.00	1890	832.87	2,088.31	0	0	0	0			Do.
Q. NW.	35th	Conn. avenue	2.00	1891	4,001.98	14,136.01	0	0	0	0			Do.
Q. NW.	21st	9th	1.98	1887	1,411.03	3,582.84	0	0	0	.063	.037		Barber.
R. NW.	7th	N. H. avenue	2.00	1888	1,601.82	4,061.99	0	0	.246	0	0		Cranford.
R. NW.	16th	Lincoln	2.00	1890	3,918.20	14,872.75	0	0					Do.
R. NW.	Fia. avenue	Lincoln	2.00	1890	3,060.88	6,101.76	0	0					Barber.
R. NW.	Lincoln avenue	B. & O. R. R. b	2.25	1890	2,890.59	8,733.98	0	0	.027				Cranford.
S. NW.	16th	N. H. avenue	2.00	1889	3,046.57	8,046.57	0	0					Do.
S. NW.	20th	Conn. avenue	2.00	1890	1,076.85	3,046.57	0	0					Barber.
S. NW.	7th	11th	2.00	1889	5,058.40	14,526.02	0	.012	.017				Cranford.
T. NW.	10th	14th	2.00	1892	5,256.35	16,805.16	0						Barber.
T. NW.	31st	32d	1.94	1895	3,738.57	11,415.38	0						Cranford.
U. NW.	32d	35th	1.93	1894	2,871.13	8,261.82	0						Barber.
V. NW.	13th	15th	1.53	1894	1,842.32								Cranford.
V. NW.	1st	K	1.68	1890	1,190.82								Do.
1st NW	S	W	2.00	1890	7,385.28	3,028.37	0	0					Do.
1st NW	C	F	1.94	1895	7,385.28								Do.
1st NE	C	F	2.00	1891	5,616.24	13,995.46	0						Do.
2d NE	F	H	2.00	1891	3,884.92	9,585.23	0						Do.
2d NE	C	Va. avenue	2.00	1890	3,178.69	12,234.64	.009	.019					Do.
2d NE	R	T	2.00	1890	4,213.24	8,701.68	0	0					Do.
2d NE	C	F	2.00	1890	4,213.24	10,850.00	0	0					Do.
2d NE	C	F	2.00	1890	4,213.24	10,850.00	0	0					Do.
4th NW	Pa. avenue	Mo. avenue	1.97	1886	2,286.83	6,208.92	0	.031	.041	.074	.15	.15	Do.
4th NW	Mo. avenue	Md. avenue	2.00	1890	4,833.16	18,978.48	.047	.017					Do.
5th NW	Q	Conn. avenue	2.00	1889	3,122.98	7,764.19	0	.009					Barber.
5th NW	Q	Fla. avenue	2.00	1889	4,436.13	11,654.27	0	.021	.006				Cranford.
5th SE	Q	E	1.93	1894	2,569.97	5,678.59							Barber.

b Laid for and at expense Geo. Truesdell.

6th NW	G	N. Y. avenue	1.97	1887	6,896.23	17,992.06	.009	.01	.031	.049	.076	Cranford.
8th NW	R	S	1.98	1887	2,063.20	5,230.57	.001	.044	.011	.07	.137	Do.
8th NW	S	Fla. avenue	2.00	1888	3,623.84	8,937.31	0	0	0	0	0	Barber.
8th SE	B	D	1.98	1887	4,764.65	10,493.37	0	0	0	0	0	Do.
9th NE	H	Mass. avenue	2.00	1891	5,781.15	17,992.48	0	0	0	0	0	Do.
9th NE	E	Capitol	2.00	1892	1,217.08	4,034.89	0	0	0	0	0	Cranford.
10th NE	G	H	2.00	1892	2,060.89	6,813.56	.004	.034	0	.204	.016	Do.
10th NW	R	S	2.00	1887	1,992.40	8,176.88	0	0	0	.008	0	Do.
12th NW	R	S	2.00	1888	2,394.00	8,119.88	.001	.018	.018	.045	.066	Do.
12th NW	R	Fla. avenue	2.00	1887	1,798.11	8,176.88	0	0	0	0	0	Do.
12th NW	S	Vt. avenue	2.00	1887	5,377.15	18,872.61	0	0	0	0	0	Do.
12th NW	S	V	2.00	1890	1,775.21	1,705.58	0	0	0	0	0	Do.
13th NW	Md. avenue	Intersection of R.	2.00	1889	1,735.22	4,401.44	0	0	0	0	0	Do.
13th NE	B	Emerson	2.00	1892	8,851.74	23,511.87	.005	.501	.073	.132	.016	Barber.
14th NW	B	Pa. avenue	1.97	1887	7,365.00	22,505.13	.008	.005	.003	0	0	Cranford.
14th NW	Fla. avenue	Yale	2.00	1889	1,785.30	5,551.52	0	.013	.043	.105	.081	Barber.
17th NW	Q	R	1.98	1887	1,874.24	6,154.05	.061	.028	0	0	0	Cranford.
17th NW	Q	R	2.00	1889	1,874.24	6,154.05	0	0	0	0	0	Do.
17th NW	Pa. avenue	N. Y. avenue	2.00	1889	4,847.07	12,684.10	0	0	0	0	0	Barber.
17th NW	R	T	2.00	1889	2,946.33	10,430.38	.018	.017	0	.074	.018	Cranford.
18th NW	P	Q	1.98	1887	1,763.70	5,896.88	0	.014	.022	0	0	Do.
18th NW	Fla. avenue and Columbia road (widened).		2.00	1891	3,206.32	6,412.14	0	0	0	0	0	Do.
18th NW	Fla. avenue and Columbia road (widened).		2.00	1891	4,405.91	6,412.14	0	0	0	0	0	Do.
21st NW	Hillyer	R	1.98	1887	988.15	2,708.34	0	.02	0	.145	.012	Do.
21st NW	R	Fla. avenue	2.00	1890	1,483.01	5,180.91	0	0	0	0	0	Do.
22d NW	M	O	2.00	1890	3,894.20	4,204.27	0	0	0	0	0	Do.
22d NW	P	Mass. avenue	2.00	1896	2,608.50	6,482.82	0	0	0	0	0	Barber.
22d NW	O	P	2.00	1889	1,585.70	4,861.67	.011	0	0	0	0	Cranford.
22d NW	Mass. avenue	R	2.00	1896	2,137.67	4,785.03	0	0	0	0	0	Barber.
25th NW	Pa. avenue	M	2.00	1890	1,692.67	5,971.73	0	0	0	0	0	Cranford.
25th NW	Pa. avenue	K	2.00	1890	1,163.37	4,146.22	0	0	0	0	0	Do.
28th NW	P	P	2.00	1890	1,474.47	3,737.13	0	0	0	0	0	Barber.
28th NW	M	P	1.90	1894	1,560.78	3,737.13	0	0	0	0	0	Thomas.
28th NW	P	Q	1.10	1890	1,261.38	3,331.14	0	0	0	0	0	Barber.
29th NW	P	Q	2.00	1890	1,261.38	3,331.14	0	0	0	0	0	Do.
30th NW	P	Q	2.00	1898	1,262.00	3,514.60	0	0	0	0	0	Do.
31st NW	K	M	1.98	1887	1,208.70	5,514.39	0	0	0	0	.015	Do.
33d NW	M	N	2.00	1890	1,580.17	5,800.23	0	0	0	0	0	Do.
33d NW	P	22d.	2.00	1890	4,674.58	9,781.00	0	0	0	0	0	Do.
34th NW	M	N	2.00	1890	1,659.61	4,957.92	0	0	0	0	0	Do.
34th NW	P	R	2.00	1891	2,264.00	8,493.90	0	0	0	0	0	Do.
34th NW	N	P	2.00	1891	2,109.23	7,926.79	0	0	0	0	0	Do.
34th NW	N	P	1.97	1887	2,929.23	8,163.70	0	.0004	0	0	.03	Cranford.
35th NW	P	Q	1.97	1887	1,558.04	5,304.95	0	.012	.033	0	.114	Barber.
35th NW	P	Prospect	2.00	1890	1,017.00	3,346.45	0	0	0	0	0	Do.
35th NW	Q	U	2.00	1890	5,749.20	18,563.05	0	.002	0	0	0	Do.
36th NW	Prospect	U	2.00	1891	2,367.64	7,994.41	0	0	0	0	0	Do.
Mass. avenue	N. J. avenue	N. Capitol	1.98	1887	5,143.20	14,178.99	0	.017	.039	.049	.038	Do.

XII OPERATIONS OF THE ENGINEER DEPARTMENT, D. C.

Asphalt pavement on 4-inch base—Continued.

Street.	From—	To—	Price per yard.	Year laid.	Square yards.	Original cost.	Cost of repairs per square yard per year after date of laying.						Contractor.
							6.	7.	8.	9.	10.	11.	
N. H. avenue.....	Q.....	R.....	2.00	1888	4,163.68	11,035.95	0	.014	.062	.018			Cranford.
N. H. avenue.....	R.....	T.....	2.00	1889	8,898.84	22,936.80	0	0	0				Do.
N. H. avenue.....	T.....	V.....	2.00	1890	6,895.01	22,074.37	0	0					Do.
N. J. avenue.....	M.....	Fla. avenue.....	1.94	1887	18,126.95	38,357.64	.027	.053	.004	.017	.07		Do.
N. Y. avenue.....	7th.....	N. J. avenue.....	2.00	1889	9,229.11	25,723.28	0	.002	.506	0			Barber.
N. Y. avenue.....	N. Capitol.....	N. J. avenue.....	2.00	1890	5,693.60	15,039.63	0	0					Cranford.
N. Y. avenue.....	N. Capitol.....	Fla. avenue.....	2.25	1891	5,392.80	16,307.53							Do.
P. A. avenue.....	8th.....	11th.....	2.00	1888	5,400.46	11,890.34	0	.001	.002	.005			Barber.
R. I. avenue.....	5th.....	N. J. avenue.....	2.00	1888	2,312.71	5,549.17	0	.007	.041	0			Do.
N. Capitol.....	Mass. avenue.....	I.....	2.00	1887	7,456.80	18,825.91	0	.007	.033	.022	.034		Do.
N. Capitol.....	Mass. avenue.....	E.....	1.88	1887	3,856.40	8,461.98	0	.022	.013	.035			Do.
N. Capitol.....	I.....	K.....	2.00	1889	2,887.33	6,327.67	0	0	0				Do.
Fla. avenue.....	7th.....	N. J. avenue.....	2.00	1888	7,207.70	18,131.79	0	.007	.028	.025	0		Do.
Fla. avenue.....	Intersection of Conn. avenue.....	4th.....			3,063.65	4,712.52							Cranford.
Fla. avenue.....	N. J. avenue.....	15th.....	2.00	1890	3,153.81	9,041.75	0	0					Barber.
Fla. avenue.....	Q.....	R.....	1.94	1895	2,612.04	6,766.86	0	0	.028	.01			Cranford.
Corcoran.....	15th.....	N. H. avenue.....	2.00	1888	4,851.49	17,451.15	0	0					Do.
Va. avenue.....	E.....	G.....	1.94	1895	397.23								Do.
Madison.....	M.....	N.....	2.00	1889	1,537.08	4,619.08	0	0					Barber.
Madison.....	17th.....	18th.....	2.00	1892	2,271.31	7,121.90							Do.
Madison.....	R.....	S.....	2.00	1889	1,446.22	3,587.15	0	0	0				Do.
Ridge.....	4th.....	5th.....	2.00	1849	2,518.00	9,552.92	0	0	0				Do.
Washington.....	4th.....	5th.....	2.00	1889	2,128.11	8,159.35	0	0	0				Do.
Marion.....	P.....	R.....	2.00	1889	2,860.89	7,766.04	0	0	0				Do.
French.....	9th.....	10th.....	2.00	1889	1,692.27	4,217.83	0	0	0				Do.
Myrtle.....	N. Capitol.....	1st.....	2.00	1889	1,425.77	4,894.01	.018	0	0				Do.
Kingman.....	P.....	Q.....	2.00	1889	1,688.79	4,578.75	0	0	.003				Cranford.
Sampson.....	14th.....	15th.....	2.00	1890	1,733.23	7,326.62	0	0	0				Do.
Pierce.....	N. Capitol.....	N. J. avenue.....	2.00	1889	5,534.77	16,077.63	0	0	0				Barber.
Euclid.....	14th.....	University place.....	2.00	1891	1,665.76	3,860.19	0						Cranford.
Emerson.....	13th.....	14th.....	2.00	1892	1,641.80	4,534.49							Barber.
Westminster.....	9th.....	N. H. avenue.....	2.00	1892	1,505.03	4,148.32							Do.
Carroll.....	10th.....	11th.....	2.00	1892	1,748.80								Do.
1st and 2d.....	B and C.....		2.00	1892	6,222.82								Do.
Hopkins.....	O and P.....	20th and 21st.....	2.00	1892	748.56								Cranford.
Pierce.....	15th.....	16th.....	2.00	1889	1,368.41	4,520.93							Barber.
Pomeroy.....	7th.....	Freemen's Hospital.....	2.00	1889	2,590.50	7,092.04	0	0	.02				Cranford.
Larch.....	Fla. avenue.....	Maple.....	2.00	1890	1,516.45	4,333.56	0	0					Barber.

Maple.....	Fia avenue.....	Linden.....	2.00	1880	3,227.32	9,279.54	0	0	.....	.....	Do. Granford.
Caroline.....	15th.....	16th.....	2.00	1881	1,323.05	4,662.59	0	.....	.....	.....	Barber.
Prospect.....	33d.....	34th.....	2.00	1880	2,418.01	7,266.96	0	.....	.....	.....	Do.
Prospect.....	35th.....	36th.....	2.00	1881	2,496.03	2,491.90	.233	.....	.....	.....	Do.
Clifton.....	14th.....	15th.....	2.00	1882	2,223.86	5,732.30	.....	.....	.....	.....	Do.
Dumbarton.....	28th.....	32d.....	1.98	1887	3,668.80	.....	0	.003	0	.015	Do.

XVI OPERATIONS OF THE ENGINEER DEPARTMENT, D. C.

Asphalt pavements on

Street.	From—	To—	Price per yard.	Year laid.	Square yards.	Original cost.
6th, NW	E	F	\$1.78	1878	1,313.00	\$2,337.46
6th, NW	N. Y. avenue	Fla. avenue	1.85	1880	16,636.25	31,645.14
6th, NW	Mo. avenue	La. avenue	2.25	1885	5,078.33	14,037.29
8th, NW	G	L	2.29	1883	4,888.36	11,202.04
8th, NW	N	R	2.29	1883	6,492.52	14,972.57
8th, SE	K	M	2.33	1883	2,929.27	6,825.20
9th, NW	P	R. I. avenue	2.28	1883	1,582.56	3,632.88
9th, NW	P	Fla. avenue	1.46	1879	6,147.14	9,513.44
9th, NW	R. I. avenue	Fla. avenue	2.30	1884	3,371.20	7,758.90
10th, NW	K	M	1.47	1880	3,368.00	5,073.63
10th, NW	F	G	1.79	1880	995.00	1,774.88
10th, NW	M	O	1.85	1881	3,442.85	6,518.68
10th, NW	O	R	2.28	1883	4,433.00	10,109.14
10th, NW	D	E	2.25	1885	1,352.50	5,562.48
10th, NW	S	T	2.25	1891	1,947.76	6,343.91
11th, NW	D	E	1.78	1878	2,500.00	4,451.00
11th, NW	O	Fla. avenue	2.25	1891	8,733.77	37,118.37
12th, NW	Pa. avenue	E	1.78	1898	1,292.00	2,315.80
12th, NW	Intersection 12th and	G	2.04	1881	198.36	406.55
12th, NW	O	R. I. avenue	2.27	1883	1,858.58	4,239.92
12th, NW	N	O	1.85	1881	1,522.36	2,873.43
12th, NW	S	V	2.00	1890	5,377.15	18,872.61
12th, NW	V	Fla. avenue	2.25	1891	3,553.67	3,553.67
13th, NW	B	C	1.78	1878	1,760.00	3,132.02
13th, NW	Intersection of N.		1.80	1879	613.91	1,120.02
13th, NW	P	Corcoran	2.09	1881	2,125.67	4,864.91
13th, NW	Intersection of B.		2.00	1889	775.21	1,705.58
13th, NW	T	Fla. avenue	2.25	1891	7,271.00	20,372.48
14th, NW	H	do	1.97	1879	29,085.00	60,211.69
14th, NW	H	M (west side)	1.75	1879	5,682.00	10,286.85
14th, NW	M	Fla. avenue	2.26	1882	14,582.94	33,716.99
15th, NW	K	R. I. avenue	1.85	1881	6,920.55	12,996.80
15th, NW	S	U	2.25	1885	3,768.00	9,467.76
15th, NW	Pa. avenue	N. Y. avenue	2.35	1889	4,218.53	13,409.62
16th, NW	H	Scott square	2.09	1881	12,450.00	27,336.05
16th, NW	R	Fla. avenue	2.29	1883	13,391.28	31,372.86
18th, NW	Intersection of G.		1.47	1879	202.74	387.92
18th, NW	Pa. avenue	E	2.05	1881	4,895.19	10,465.79
18th, NW	D	E	2.25	1891	1,544.09	5,240.72
18th, NW	N. H. avenue	S	2.25	1891	3,129.91	10,79.67
19th, NW	N	Circle	2.06	1881	2,408.72	5,177.76
20th, NW	Pa. avenue	I	1.46	1879	981.00	1,483.70
22d, NW	K	M	2.25	1885	2,852.00	6,723.28
30th, NW	N	P	2.23	1883	2,932.19	7,961.83
31st, NW	P	U	2.26	1885	1,832.23	4,140.82
35th, NW	U	Tenallytown road	2.25	1891	6,009.13	18,241.69
Ind. avenue	1st	3d	2.00	1887	8,529.28	23,824.87
La. avenue	3d	7th	1.85	1881	4,054.8	6,888.66
Mass. avenue	9th	13th	1.47	1880	9,920.00	14,748.85
Mass. avenue	3d	7th (south side)	1.85	1881	3,910.36	7,349.45
Mass. avenue	1st	3d	2.26	1882	3,837.74	8,831.79
Mass. avenue	4th	7th	2.29	1883	3,108.45	7,112.15
Mass. avenue	N. Capitol	1st	2.25	1891	4,068.8	12,102.25
Md. avenue	1st	3d	2.19	1883	3,394.00	7,799.72
N. H. avenue	Pa. avenue	M	1.47	1879	6,99.00	10,524.79
N. H. avenue	M	P	2.25	1882	10,047.00	22,988.34
N. H. avenue	P	Q	2.26	1885	2,537.73	6,029.29
N. J. avenue	D	L	2.26	1882	21,462.90	49,632.56
N. J. avenue	L	N. Y. avenue	2.25	1884	3,663.52	8,398.17
N. Y. avenue	13th	14th	2.00	1891	5,355.27	11,273.22
Pa. avenue	1st	17th	3.78	1876-7	69,299.83	132,387.10
R. I. avenue	13th	16th	1.84	1881	7,723.37	14,574.26
R. I. avenue	9th	13th	2.26	1882	9,219.23	21,077.10
R. I. avenue	5th	9th		1883	8,120.09	(a)
Vt. avenue	P	R	2.09	1881	6,103.35	16,374.36
N. Capitol	B	C	2.25	1883	2,789.62	6,755.40
N. Capitol	K	M	2.25	1891	6,207.28	19,418.86
E. Capitol	1st	9th	2.04	1879	10,511.00	21,521.70
E. Capitol	4th	11th	2.35	1883	6,988.68	16,462.35
Corcoran	18th	19th	2.25	1890	1,162.89	4,841.92
Grant	9th	10th	4.25	875	1,434.61	6,097.19
Madison	15th	17th	3.00	1875	2,674.00	8,022.00
Riggs	16th	17th	2.25	1892	1,620.14	5,078.76
Potomac	Prospect	O	2.25	1884	1,829.60	4,332.13

a Private expense.

OPERATIONS OF THE ENGINEER DEPARTMENT, D. C. XVII

6-inch base—Continued.

Cost of repairs per yard per year after date of laying.																						
6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.	17.	18.	19.	20.	21.	22.	Contractor.					
0	.003	.107	.155	.111	.03	2.702	0	.004	0	.005	0	.008	.01				Baldwin.					
.0001	0	.0005	.0005	.036	.004	.023	.025	.016	.003	.006	.006						Do.					
.003	.046	.014	.036	.03	.05	.043											Barber.					
0	.005	.001	.168	.039	.04	.061	.019										Do.					
0	0	.132	.009	.032	.034	.01	.078	.014									Do.					
.009	.018	0	.015	.011	.012	.047	.024	.009	.048								H. L. Cran-					
																	ford.					
0	0	.022	.03	.141	0	.064											Barber.					
0	0	.006	0	.002	0	.009	0	.023	.036	.001	.004	.003					Baldwin.					
0	0	0	.095	.03	.029	.042											Cranford.					
0	0	.023	.046	.023	.026	.03	.021	.028	.025	.249							Baldwin.					
0	0	.007	0	.063	0	0	.026										Do.					
.003	0	.019	.019	.041	0	0	.053	0	.058								Cranford &					
																	F.					
.001	0	.014	.064	.011	.179	0	.147	.006									Barber.					
0	.009	.029	.012	.024	.036	.01											Do.					
0	0																Do.					
0	0	.049	.062	.082	.085	.146	.157	1.736	0	0	0	.033					Baldwin.					
0	0																Barber.					
0	.02	.947	.05	.03	.041	.09	.044	.102	.038	.016	.126	.069	.05				Baldwin.					
0	0																Cranford.					
0	0	.084	.056	.075	.001	.061	.032										Barber.					
0	.011	0	0	.012	0	0	0	0	0	.003							Baldwin.					
0	0																Cranford P.					
																	Co.					
0																	Cranford.					
0	.104	.10	.021	.128	.184	.118	1.324	.021	.003	.045							Baldwin.					
0	0	0	0	0	0	0	0	0	0	.007	.141						Do.					
0	.029	.006	.023	.086	.05	.029	.049	.024	.101	.01							Barber.					
0	0																Cranford.					
0	0																Barber.					
.005	.017	.035	.058	.038	.052	.69	.841	.002	0	.022	.001						Murdock.					
0	.041	0	0	.087	.047	.077	.041	.026	1.093	0	.012	.044					Baldwin.					
0	.026	.009	.07	.055	.032	.054	.153	.03	.041								Barber.					
.031	.025	.023	0	0	.004	0	.045	.006	.008	.028							Cranford P.					
																	Co.					
0	.006	0	0	.006	.007	.016											Barber.					
																	Do.					
.001	0	.023	.004	.036	.015	.022	0	.01	.048	.032							Do.					
0	.016	0	.028	.179	.067	.002	.048	.087	.472								Do.					
0	0	0	0	.278	0	.167											Baldwin.					
0	0	0	.007	0	.007	.04	.046	.011	.045	.04							Barber.					
0																	Do.					
0	.021	0	0	.076	0	.009	.643	.07									Cranford.					
0	0	0	0	.072	0	0	.028	.132	0	0	.02						Barber.					
0	0	0	0	.025	0	.049											Murdock.					
0	0	.015	0	.109	.131	.047	.039	0	.069								Barber.					
0	0	0	.047	0	.044												Do.					
																	Barber.					
.0005	.007	.01	.008	.008													Do.					
0	0	.044	.003	.033	.064	.002	0	.009	.031	.019							Baldwin.					
0	.0001	.308	.005	.003	.021	.011	0	.015	.006	.014	.03						Do.					
.207	.001		.016	.021	.097	.075	.69	.029	.056	.049							Cranford.					
.004	.05	.111	.021	1.48	0	.004	.002	.04	.033								Do.					
0	.038	.129	.024	.018	.029	0	.018	.026									Barber.					
0																	Do.					
0	0	.004	.019	0	.091	.018	.065	.063									Do.					
0	0	.023	0	0	.013	0	.049	.023	.003	0	.052						Baldwin.					
0	.004	.03	.043	.06	.03	.011	.094	.017									Barber.					
0	0	0	.025	.003	.027												Cranford.					
0	0	.004	.007	.027	.04	.081	.023	.015	.033	.036							Barber.					
0	.014	.061	.031	.016	.054	.051											Do.					
0																	Cranford.					
.006	.012																Cranford.					
0	.052	.074	.036	.005	.383	.011	.015	.006	.016	.002							Barber.					
																	Baley &					
.065	.011	.014	.011	.034	.055	.023	.004	.036	.03								Fletcher.					
.015	.012	.117	.082	.064	.002	.10	.081										Cranford.					
0	0	.016	.029	.142	.023	.047	.035	0	.093	.107							Barber.					
.035	0	.028	.086	0	.038	0	.086	.016									Do.					
0																	Do.					
.002	.001	.118	.109	.134	1.066	.301	0	0	.039	.016							Murdock.					
0	0	.033	.014	.028	.001	.009	.072	.029									Barber.					
0	0																Cranford.					
0	0	.076	0	.006	0	.01	.062	.023	.328	.027	.053	.024	0	.055			Davis.					
0	0	.0006	.006	.008	.003	0	.046	.054	.027	0	.029	.041	.033	.007	.128	.031	Murdock.					
0																	Barber.					
0	0	.015	.128	.024	.032	0	.195										Do.					

XVIII OPERATIONS OF THE ENGINEER DEPARTMENT, D. C.

Asphalt block pavements.

Street.	From—	To—	Price per sq. yd.	Year laid.	Square yards.	Original cost.	Contractor.	Remarks.
A. NE	7th	9th	\$2.00	1890	2,300.22	\$4,725.70	Patrick Maloney	
A. SE	6th	7th	1.94	1887	2,390.86	5,994.82	do	
A. SE	3d	6th	2.10	1886	3,317.21	7,918.95	Washington Asphalt Block and Tile Co.	
A. SE	7th	N. C. avenue	2.00	1894	8,043.07	8,182.45	do	
B. SE	11th	N. C. avenue	2.00	1891	4,577.53	15,475.22	P. Maloney	
C. NE	4th	6th	2.00	1886	4,478.23	12,493.13	do	
C. NE	6th	8th	2.00	1888	3,986.09	9,895.42	do	
C. NE	8th	10th	2.00	1891	2,180.44	7,249.69	do	
C. SE	N. J. avenue	4th	2.10	1884	6,922.32	17,212.57	Maloney & Knight	
C. SE	9th	12th	2.10	1885	3,253.11	7,679.93	P. Maloney	
C. SE	6th	7th	2.10	1890	2,141.67	5,878.07	do	
C. SW	12th	14th	2.10	1888	3,839.57	9,115.37	do	
C. SE	4th	6th	2.10	1880	1,483.64	3,496.49	do	
C. SE	4th	6th	2.10	1891	1,613.50	3,814.05	do	
D. SE	1st	3d	2.10	1889	4,393.58	11,281.93	do	
D. SE	7th	9th	2.10	1889	1,205.12	2,906.59	do	
D. SE	3d	6th	2.10	1890	3,893.57	9,978.56	do	
D. SE	9th	Pa. avenue	2.10	1892	1,951.42	6,187.89	do	
D. SW	7th	9th	1.84	1896	2,064.07	4,469.30	Washington Asphalt Block and Tile Co.	North side. South side.
E. NW	13th	14th	2.37	1878	1,093.35	2,681.61	Jonathan Taylor	Relaid by P. Maloney, 1898.
E. NE	1st	4th	2.00	1893	5,640.27	16,003.96	Washington Asphalt Block and Tile Co.	
E. SE	S. Capitol	3d	1.78	1896	7,819.48	18,888.00	do	
F. SW	7th	10th	1.77	1896	3,972.78	8,698.56	do	
G. SE	11th	Pa. avenue	2.00	1891	1,730.24	8,084.55	P. Maloney	
H. NW	Conn. avenue	Vt. avenue	1.76	1881	2,898.93	7,681.03	John Cudmore	Resurfaced by H. L. Cranford, 1887; cost, \$1,869.46.
I. SW	3d	6th	1.77	1896	4,860.13	10,492.93	Washington Asphalt Block and Tile Co.	
N. NW	28th	30th		1892	1,598.68	3,824.24	P. Maloney	
W. NW	Le Droit avenue eastward.			1895		3,023.52	Washington Asphalt Block and Tile Co.	Resurfaced with asphalt by H. L. Cranford; cost, \$2,409.51.
1st. SE	C	D	2.00	1889	1,200.05	2,631.08	B. Maloney	Laid at cost of property owners.
2d. NE	C	Md. avenue	1.94	1887	1,845.75	4,787.02	do	
2d. NE	C	F	2.00	1894	4,323.42	10,787.77	Washington Asphalt Block and Tile Co.	
3d. NE	C	Md. avenue	1.99	1887	1,090.20	2,976.63	P. Maloney	
3d. SE	Pa. avenue	C	1.99	1897	1,987.80	2,561.51	do	

Resurfaced with asphalt, by H. L. Cranford, 1897, cost, \$5,237.12.

4th, SE.	Pa. avenue.	E. Capitol.	2.19	1893	4,152.06	9,233.33	.....do
4th, NE.	E. Capitol.	Md. avenue.	2.10	1895	4,525.67	10,232.41	Maloney & Knight
4th, NE.	Mass. avenue.	N. C. avenue.	2.00	1897	1,912.16	4,472.46	P. Maloney
4th, SE.	Pa. avenue.	N. C. avenue.	2.00	1890	1,592.61	1,389.29	.....do
4th, NE.	C	D.	2.00	1890	836.92	1,971.92	.....do
4th, NW.	Pa. avenue.	D.	2.00	1899	4,548.93	14,669.00	.....do
5th, NE.	E. Capitol.	Md. avenue.	2.10	1896	4,876.48	12,130.88	.....do
5th, SE.	C	C, crossing square.	2.00	1890	693.07	1,675.01	.....do
5th, NE.	C	D.	2.00	1890	875.07	2,060.02	.....do
6th, SE.	Pa. avenue.	E.	1.99	1897	4,398.76	10,429.89	.....do
6th, SE.	Pa. avenue.	E. Capitol.	2.10	1896	5,948.90	13,796.66	.....do
6th, SE.	E. Capitol.	Md. avenue.	2.10	1896	4,626.32	10,799.86	.....do
6th, NE.	Mass. avenue	Md. avenue.	2.10	1897	1,997.60	4,698.86	.....do
6th, SE.	E.	Va. avenue.	2.10	1899	4,774.52	12,150.51	.....do
6th, NE.	C	D.	2.10	1891	837.85	1,974.79	.....do
7th, NW.	Intersection of La. avenue.		1.87	1879	3,214.08	6,349.51	McKnight & Burns.
7th, NE.	E. Capitol.	Mass. avenue.	1.99	1893	3,339.57	8,941.78	P. Maloney
7th, SE.	E. Capitol.	Pa. avenue.	1.99	1897	7,223.00	22,140.38	.....do
7th, NE.	D.	D.	2.00	1899	3,315.40	11,144.14	.....do
7th, SE.	B.	Va. avenue.	2.00	1899	8,394.28	27,312.26	.....do
8th, NE.	E. Capitol.	Mass. avenue.	2.00	1899	2,969.41	7,341.65	.....do
8th, NE.	Md. avenue.	B.	2.00	1891	5,855.97	15,645.38	.....do
9th, NE.	Md. avenue.	Md. avenue.	2.00	1891	6,711.88	21,589.26	.....do
10th, NE.	B.	Md. avenue.	2.10	1896	2,410.69	5,543.79	.....do
10th, SE.	D.	Pa. avenue.	2.00	1891	788.12	2,498.99	.....do
10th, SE.	Pa. avenue.	I.	1.80	1895	4,927.38	12,466.06	Washington Asphalt Block and Tile Co.
11th, SE.	E. Capitol.	C.	2.00	1891	8,076.09	23,775.77	P. Maloney
11th, SE.	C	Pa. avenue.	2.00	1898	7,005.88	19,522.77	Washington Asphalt Block and Tile Co.
11th, NE.	E. Capitol	Mass. avenue.	1.84	1895	1,092.90	2,500.04	.....do
13th, NW.	B.	D.	1.84	1895	3,016.31	6,635.03	.....do
15th, NW.	Pa. avenue.	B.	2.19	1893	7,012.10	15,911.25	P. Maloney
18th, NW.	K.	L.	2.10	1896	1,430.80	3,285.68	.....do
21st, NW.	Q.	Hillyer	.....	.....	956.00	.....	Superintendent of streets
23d, NW.	K.	M	2.10	1896	2,386.81	5,428.99	P. Maloney
29th, NW.	N.	P	2.19	1893	2,966.05	6,495.10	.....do
31st, NW.	N.	P	.....	1892	3,338.56	5,607.73	.....do
Mass. avenue	6th, NE	8th.	2.00	1899	6,749.41	16,444.36	.....do
Mass. avenue	1st, NE	2d	2.00	1893	3,960.59	11,683.74	Washington Asphalt Block and Tile Co.
Mass. avenue	8th, NE	11th	1.84	1895	6,398.35	18,677.38	.....do
Md. avenue	1st, NE	4th	2.00	1897	11,535.48	28,944.66	P. Maloney
Md. avenue	6th, NE	11th	2.00	1899	14,960.90	39,683.96	.....do
Md. avenue	11th, NE	18th	2.00	1890	8,268.53	22,965.91	.....do

Minor repairs, 1891, 0.062 cent; 1893 0.061 cent; 1897, 0.75 cent per square yard of total area.

Resurfaced by Cranford, 1893-94; cost \$8,680.41.

Paid by property owners.

Resurfaced by Cranford, 1893-94; cost \$4,601.76.

Resurfaced by Cranford, 1893-94; cost \$4,227.16.

Asphalt block pavements—Continued.

Street.	From—	To—	Price per yard.	Year laid.	Square yards.	Original cost.	Contractor.	Remarks.
Md. avenue	13th, NE.	15th	\$2.00	1891	9,635.10	\$24,839.88	P. Maloney	
Mo. avenue	4th, NW	6th	2.00	1894	1,371.22	4,745.17	Washington Asphalt Block and Tile Co.	
N. C. avenue	3d, SE	6th	2.00	1890	5,032.66	12,450.60	P. Maloney	
N. C. avenue	6th, SE	8th	2.00	1891	6,377.84	16,714.70	.....do	
N. C. avenue	8th, SE	11th	2.00	1892	6,479.79	18,185.64	.....do	
S. C. avenue	6th, SE	7th	2.00	1891	3,397.74	9,214.01	.....do	

Estimate of cost of completing so much of the project for sewage disposal as will permit the abandonment of James Creek Canal. (October 19, 1898.)

Intercepting sewer in Four-and-a-half street	\$112,550.10
Completion of Tiber Creek and New Jersey avenue high-level intercepting sewer	263,511.50
B street and New Jersey avenue trunk sewer between pumping station and Seventh street west	543,917.20
Pumping station	602,250.00
Total	1,522,228.80

This canal now receives the sewage from 2,256 acres of land within the city, and from 1,344 acres of land outside of Florida avenue, by means of the Tiber sewer, its tributaries, and the smaller sewers below the Tiber sewer outlet. It will be necessary to complete the Tiber Creek and New Jersey avenue high-level intercepting sewer. This will intercept the sewage in the Tiber sewer above the crossing of Indiana avenue.

The B street and New Jersey avenue trunk sewer, from the intersection of Seventh and B streets NW. to the site of the proposed pumping station, must be constructed. This sewer is required to intercept the sewage from the lower grounds adjacent to Pennsylvania and Garfield avenues. The Four-and-a-half street intercepting sewer and the M street intercepting sewer, between Four-and-a-half street and New Jersey avenue, are required to intercept the sewage from a large section of South Washington. The pumping station, at the lower end of New Jersey avenue, with the necessary tide gates, screen chambers, and pumping machinery, will be required for the discharge of the sewage into the Anacostia River.

Estimate of cost of sewage-disposal project. (October 19, 1898.)

Rock Creek and B street intercepting sewer	\$377,887.80
Appropriation made	190,000.00
Required for completion	\$187,887.80
Extension of northeast boundary sewer, not in estimate of board	190,000.00
East side intercepting sewer:	
To Twelfth street east, estimate of board	85,467.80
From Twelfth street east, eastward, not in estimate of board	180,000.00
Water and M streets intercepting sewer	162,173.60
Four-and-a-half street sewer	112,550.10
Tiber Creek and New Jersey avenue sewer	\$483,511.50
Appropriation made	220,000.00
Required for completion	263,511.50
B street and New Jersey avenue trunk sewer	719,101.30
Outlet to old B street sewer	30,716.00
Pumping station (\$627,250, appropriation of \$25,000)	602,250.00
Outfall sewer, inverted siphon and outlet	679,376.90
Dikes	44,600.00

Required for completion 3,257,635.00

NOTE.—The above estimate is compiled from the estimates of the "board of sanitary engineers, 1890," with the exceptions noted, and is intended to cover the cost of completion of the project.

Appropriations made:

Easby Point sewer	\$250,000.00
Fifteenth and F streets sewer	87,000.00
Rock Creek and B street sewer	190,000.00
Tiber Creek and New Jersey avenue sewer	220,000.00
Pumping station (plans, etc., for)	25,000.00

Total 772,000.00

Appropriations for 1893 to 1899, \$128,666.66 average per year.

Total cost \$4,029,635. At average amount of appropriations it will require twenty-six years, or until 1925, to complete the project.

Statement of asphalt surface laid over old pavements.

LAID OVER COBBLE.

Street.	From—	To—	Year laid.	Square yards.	Cost.	Cost per square yard.	Price of asphalt, new pavements.	Repairs.	Present condition.	Contractor.
Prospect	32d	Potomac	1891	2,113.19	\$3,886.09	\$1.84	\$2.00	None	Good	Barber Co.
20th, NW	E.	S.	1890	1,904.04	3,403.43	1.73	{ 2.25 2.00 }	.....do.....	.....do.....	Do.
E. NW.	13d.	15th.	1889	3,030.84	4,894.93	1.61	2.00	\$5.77	.....do.....	Do.
9th, SW	B.	C.	1889	1,435.73	2,331.48	1.59	2.00	2.10	.....do.....	Do.
8th, SW	B.	C.	1890	1,434.14	2,486.70	1.73	2.00	None .....	.....do.....	Do.
22d, NW	F.	G.	1892	1,257.06	2,187.98	1.74	{ 2.25 (4-inch) 2.00 (4-inch) }	.....do.....	.....do.....	Do.
F. NW.	22d.	Va. avenue	1893	1,808.44	2,277.13	1.70	{ 1.93 (4-inch) 2.185 (6-inch) }	.....do.....	.....do.....	Do.
K. NW.	1st.	3d.	1894	3,934.36	6,717.98	1.68	{ 1.90 (4-inch) 2.10 (6-inch) }	.....do.....	.....do.....	Thomas.
28th, NW	M.	Dumbarton	1894	2,877.14	4,492.46	1.56	{ 1.68 (4-inch) 2.00 (6-inch) }	.....do.....	.....do.....	Do.
D. NW.	14th.	15th.	1895	1,675.02	2,804.14	1.67	{ 1.53 (4-inch) 1.68 (6-inch) }	.....do.....	.....do.....	Do.

LAID ON ASPHALT BLOCK.

H. NW. a.	Vt. avenue	Conn. avenue	1893	2,403.56	\$3,850.48	\$1.48	\$2.00	.....do.....	Fair	Cranford.
29th, NW	Dumbarton	P.	1893	2,045.84	3,016.92	1.50	{ 1.84 (4-inch) 2.185 (6-inch) }	None	Good	Do.
31st, NW	N.	P.	1893	2,957.25	4,227.15	1.43	{ 1.93 (4-inch) 2.185 (6-inch) }	.....do.....	.....do.....	Do.
29th, NW	N.	Dumbarton	1894	922.96	1,584.86	1.60	{ 1.90 (4-inch) 2.10 (6-inch) }	.....do.....	.....do.....	Do.
15th, NW	Pa. avenue	E.	1893	771.91	1,084.70	1.40	{ 2.10 (4-inch) 2.185 (6-inch) }	.....do.....	.....do.....	Do.
15th, NW	E.	B.	1893	5,251.72	7,599.71	1.40	{ 2.185 (6-inch) 2.00 (6-inch) }	.....do.....	.....do.....	Do.
N. NW.	28th.	30th.	1896	1,604.39	2,409.31	1.50	{ 1.68 (4-inch) 2.00 (6-inch) }	.....do.....	.....do.....	Do.
4th, SE	E. Capitol.	Pa. avenue	1896	3,445.94	5,251.18	1.52	{ 1.68 (4-inch) 2.00 (6-inch) }	.....do.....	.....do.....	Do.

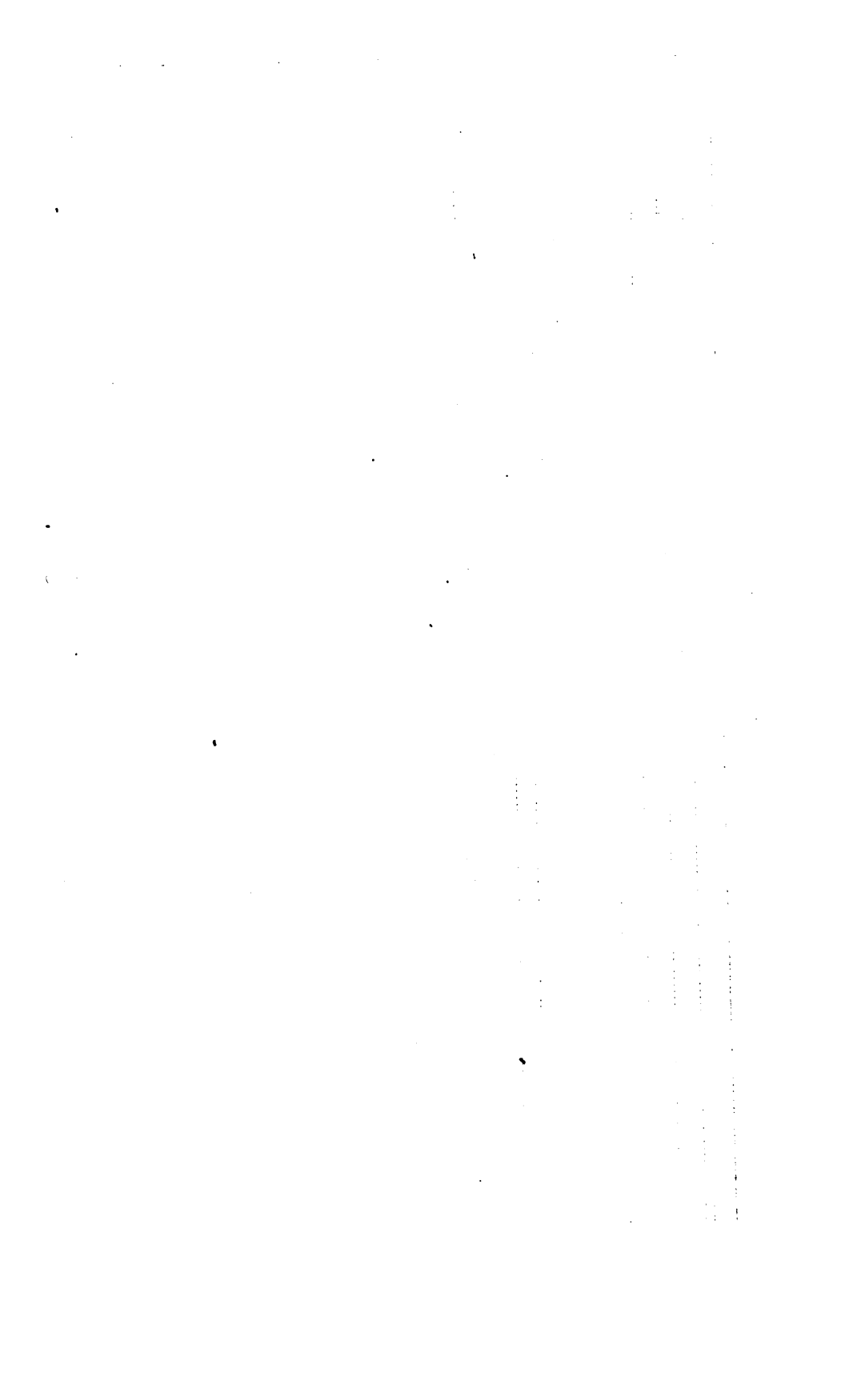
LAI D ON MACADAM.

I, NW	Pa. avenue.....	23d	1881	6, 285.58	\$10, 035.70	\$1.60	{ \$2.00 (4-inch) } { 2.25 (6-inch) }	None ...	Good	Barber Co.
1st, NW	R	S	1882	1, 696.99	2, 904.19	1.71	{ 2.00 (4-inch) } { 2.25 (6-inch) }	.....do .....	.....do	Do.
North side of Lincoln square.....			1894	4, 076.51	6, 870.33	1.70	{ 1.90 (4-inch) } { 2.10 (6-inch) }	.....do .....	.....do	Thomas.

LAI D ON GRANITE BLOCK.

D, NW	8th	9th	1885	935.54	\$1, 238.99	\$1.38	{ \$1.53 (4-inch) } { 1.68 (6-inch) }	None ...	Good	Thomas.
6th, NW	F	G	1896	975.18	780.14	.80	Bermudez binder laid as an experiment.	.....do	Badly worn...	Do.

a H street NW., between Vermont avenue and Connecticut avenue, was surfaced with coal-tar distillate, on which the contractor made extensive repairs during the guarantee period. It is now in fair condition.



REPORT OF THE OPERATIONS OF THE ENGINEER DEPARTMENT.

SECOND DIVISION.

(Capt. L. H. BEACH,

Corps of Engineers, United States Army, Assistant to the Engineer Commissioner, in charge until May 31, 1898.)

STREETS, PAVEMENTS, GRADES, AND CONSTRUCTION OF ROADS..	CONWAY B. HUNT,
SIDEWALKS AND ALLEYS	H. N. MOSS,
MAINTENANCE OF COUNTY ROADS.....	GEORGE N. BEALE,
CONSTRUCTION AND CARE OF BRIDGES	GEORGE H. BAILEY,
SEWER CONSTRUCTION AND MAINTENANCE	D. E. MCCOMB,
PLUMBING PLANS AND INSPECTION	CHARLES B. BALL,
INSPECTION OF ENGINEERING MATERIALS AND CARE OF PROP- ERTY.	C. T. SHOEMAKER,
TESTING OF ENGINEERING MATERIALS	A. W. DOW,
PERMITS.....	H. M. WOODWARD, Permit Clerk.

REPORT OF THE COMPUTING ENGINEER.

WASHINGTON, D. C., July 1, 1898.

CAPTAIN: I have the honor to report the following as the operations of the surface division for the fiscal year ended June 30, 1898:

Summary statement of work done under appropriations for "Improvements and repairs" and "Construction of county roads and suburban streets."

	Improve- ments and repairs.	County roads.	Total.
Asphalt, 6-inch base	40, 078. 81	15, 593. 62	55, 672. 43
Asphalt block.....do.....	18, 234. 93	4, 448. 27	22, 683. 20
Granite block.....do.....	4, 416. 00	.....	4, 416. 00
Macadam roadway.....do.....	11, 221. 04	14, 186. 45	25, 407. 49
Gravel roadway.....do.....	.....	27, 060. 26	27, 060. 26
Grading (ordinary).....cubic yards..	17, 786. 26	101, 490. 78	119, 277. 04
Grading (macadam).....do.....	2, 924. 60	2, 435. 27	5, 359. 87
Old cobble removed.....square yards..	32, 425. 38	4, 484. 64	36, 910. 02
Old curb removed.....linear feet..	16, 924. 70	4, 068. 00	20, 992. 70
Curb reset.....do.....	15, 939. 40	2, 641. 39	18, 580. 79
Curb set.....do.....	21, 364. 60	6, 879. 61	28, 244. 21
Vitrified-block gutters.....square yards..	5, 192. 63	2, 383. 76	7, 576. 39
Cobble gutters and crossings	do.....	14, 340. 63	14, 340. 63

The detailed statements are given in Tables A and B.

The work under "Repairs to concrete pavements" is shown by Table C.

Resurfacing has been confined to original coal-tar pavements, which are thenceforth considered as asphalt pavements.

The old pavements on a portion of New York avenue, Seventeenth, Eighteenth, and G streets, SW., and Pennsylvania avenue, amounting to 13,257 square yards, were removed and standard asphalt pavements laid. In most cases this was necessary in order to preserve or improve the grade and to prevent an undue elevation of the surface, which is the result of resurfacing over coal-tar pavements. In other cases the old bituminous base was so weak and rotten that the pavements were rapidly going to pieces.

Table D shows the character and extent of street pavements, and Table E gives the mileage. Included in these is the pavement laid in suburban subdivisions by property owners in Eckington, Petworth, Washington Heights, and Tunlaw Heights, amounting to 69,471 square yards. These pavements have never been formally accepted, but, having cost the District nothing, the least that can be expected will be that they be kept in repair at public expense.

All asphalt pavements have been laid with Trinidad asphalt, excepting the following, laid with Bermudez asphalt:

Bermudez asphalt laid by Thomas H. Thomas.

Street.	From—	To—	4-inch base.	6-inch base.	On cobble.	On macadam.	On granite.	Binder, on granite.
			<i>Yards.</i>	<i>Yards.</i>	<i>Yards.</i>	<i>Yards.</i>	<i>Yards.</i>	<i>Yards.</i>
S NW.....	New Hampshire avenue.	Twentieth.....	5,195					
Do.....	Seventh.....	Florida avenue	4,539					
E SE.....	Between Twelfth and Thirteenth	P.....	618					
Twenty-eighth M.....	North Capitol.....	Second.....	1,551		2,877			
North side Lincoln square.....				5,486				
K NW.....	First.....	Third.....			3,984	4,077		
D NW.....	Fourteenth.....	Fifteenth.....			1,675			
Do.....	Eighth.....	Ninth.....					936	
Sixth NW.....	F.....	G.....						975
Total.....			2,169	15,220	8,536	4,077	936	975

Table F shows work done at the cost of the various street railway companies.

Table G shows the length of street railways in the District.

The details of character and extent of street pavements to this date are shown by Table H.

The appropriation for "Repairs to streets, avenues, and alleys" was \$30,000, as in former years. A departure from former practice in its expenditure was inaugurated by the improvement of a number of roadways by resurfacing with macadam and gravel under the constant service of a steam roller. The following roadways were thus improved. The other details of the expenditure of the appropriation are given in the report of the superintendent of streets.

Statement of streets spiked, rolled, and graveled.

Location.	Square yards.
Eleventh street NE., between D and E streets.....	980
B street NE., between Tenth and Twelfth streets.....	2,032
Thirty-seventh street NW., between Back street and Wisconsin avenue.....	350
Florida avenue, between W and Champlain avenue.....	1,950
Back street and Thirty-seventh intersection.....	444
Florida avenue, between Fourteenth and Fifteenth streets.....	3,040
K street SW., between First and Four-and-a-half streets.....	6,130
I street SW., between Sixth and Seventh streets.....	1,544
L street SE., between Third street and New Jersey avenue.....	3,400
Florida avenue, between Twelfth and Fourteenth streets.....	4,754
Grant avenue, between Seventh street and Sherman avenue.....	4,500
Total.....	29,124

As an incident to the expenditure, by contract, of the bulk of the appropriation for "Improvement and repairs," "Repairs to concrete pavements," and "Construction of county roads," and on account of other appropriations not under the control of the surface division, there were executed miscellaneous items of work by day

labor during the year, as shown in detail in Statement N. This work amounted to \$16,754.80.

In Statement P is given the details of repairs to cuts made by plumbers and by corporations and District employees, and a comparative statement of the number and cost of plumber cuts made in preceding years.

The statement of the number of inspectors, overseers, and other employees temporarily required is as follows:

Assistant engineers, inspectors, foremen, and other employees of the surface division and engineers' stable temporarily required and appropriations from which paid for year ending June 30, 1898.

Class.	No.	Repairs to concrete pavements.	Repairs to county roads.	Construction of county roads.	Assessment and permit work.	Sidewalk and curb.	Improvements and repairs.	Ordinary care of bridges.	Construction and repair of bridges.
Assistant engineers	3	.....	\$577.40	\$1,347.36	\$462.10	.....	.....	\$500.00	\$1,500.00
Inspectors	22	\$296.00	.....	2,118.25	1,798.00	.....	\$3,176.75	.....	.....
Foremen	13	116.00	3,492.00	582.00	2,619.00	\$96.00	698.00	106.00	900.00
Other employees	609	9,171.71	28,206.44	6,006.26	23,260.66	857.82	11,185.76	1,458.48	5,888.53
Total	.....	9,583.71	32,275.84	10,053.87	28,139.76	953.82	15,060.51	2,064.48	8,288.53

Class.	Widening P street bridge.	Bridge over Rock Creek.	Emergency fund.	Engine houses.	Special repairs to market houses.	Various deposits.	Act to prevent scarlet fever.	Current repairs to streets, avenues, and alleys.	Total.
Assistant engineers	\$100.00	.....	.....	.....	.....	.....	.....	.....	\$4,486.88
Inspectors	.....	.....	.....	.....	.....	\$364.00	.....	.....	8,253.00
Foremen	8.00	\$40.00	\$80.00	\$12.00	\$4.00	.....	\$8.00	\$2,910.00	11,671.00
Other employees	67.75	313.82	667.13	183.00	30.85	63.82	96.20	23,070.69	110,528.92
Total	175.75	353.82	747.13	195.00	34.85	927.82	104.20	25,980.69	134,939.78

The labor incident to the proper compilation of this statement is very great, due to the opinion adhered to for several years that laborers on the work were to be included as "other employees." I am confident that such is not the intent of the law, which has been repeated annually for many years in the appropriation acts. It is believed that the employees referred to are those, of whatever designation, temporarily required for the laying out, inspection, overseeing, and executive control of the work in the office and field, and it is hoped that future appropriation acts will be either so construed or their phraseology conformed to their intent.

The reports of the engineer of bridges, superintendent of streets, and superintendent of roads are transmitted herewith.

It is believed that the policy pursued by the office during the past year of excluding macadam and gravel roadway pavements from streets added to the schedule of work submitted in the yearly Books of Estimates, is sound and should be perpetuated. The proper materials for this class of work are such as are best suited to the street and its traffic, and it is certain that a sheet or block pavement offers every advantage. A roadway improved with macadam or gravel is found in a short time again pressing for a place on the list of streets to be paved. Once paved with proper regard to its requirements, it is eliminated from future similar consideration. The graveling and macadamizing of any roadways can promptly and properly be provided for a comparatively moderate cost from the repair appropriation should the policy be encouraged of thus repairing a roadway where new curb and sidewalks have been provided under the assessment system. The advantage of this is double, in that the property owners are encouraged by the offer of road repairs to make free use of the assessment system in localities that might otherwise hesitate to seek improvement involving assessment; while the road improvement is always an advantage, often a necessity, in the protection of the new curb and sidewalk work. Under such circumstances much good can be accomplished with comparatively slight expenditure.

It has been in every way advantageous in the construction of gravel and macadam roadways to execute the work by day labor. This practice has been followed as far as possible. The advantage is real and based on experience. A requirement of the organic act provides for a five-year guaranty on all new work done by contract, and during that time no public funds can be expended on the street. The practical fact is that the necessary repairs to such a roadway are frequently such as are done

to causes such as will not permit the contractor to be called upon for their repair. The history of such efforts has been allegation and contradiction as to the cause of defects and the responsibility for such causes, with often the enforced admission that natural causes have resulted in defects and injuries whose repair can not be exacted under the guaranty. At the same time their correction from public funds is unlawful, though at trifling cost, and thus, between two conditions, the roadway continues until the five-year period expires, when the repairs originally indicated become a charge, at an increased cost, upon the appropriation for such work, the public having, meanwhile, lost the fullest advantage that would result from the maintenance of the roadway in the best condition. Were it possible to waive the five-year guarantee clause as to macadam or gravel roadways, their construction by contract would be indicated; but, in default, the greatest advantage results from the purchase and delivery of the material by contract, and its construction into a roadbed by day labor, and this course is the one now followed. The fact that the District owns the steam rollers proper for such work, while local contractors do not, is a further advantage of this method.

In the selection of the material for roads it has been recognized that the local macadam material is almost all of inferior quality, some worse than others. While suitable for the body of the road, nothing like in quality to trap rock has hitherto been available for a top layer within the range of justifiable cost. Continued efforts to secure such material are likely to result in far-reaching good. For the repair of the surface of old macadam and gravel roads, and as a binder course (mixed with bank gravel) for new macadam, the use of screened or washed gravel is giving increased satisfaction. While somewhat expensive, the quantity necessary to be used is so moderate on a given piece of work that economy, in view of the excellent results secured, can fairly be claimed. A good, and fairly permanent, surface has even been secured by the use of this material spread to a depth of $1\frac{1}{2}$ inches on a dirt road, watered and rolled, but this was exceptional and is not advocated as a construction. The usual course in repairing macadam and gravel roads, when general treatment is necessary, is to remove all dirt from the road, then to spike the surface with the steam roller thoroughly. The spiked surface is then worked over with a heavy harrow, made for the work, as nothing bought in the local markets would stand the strain. The roadway material is then shaped so as to provide proper crown and transverse grade, and it is frequently necessary to provide additional material to supply losses due to wear. The steam roller now thoroughly compacts the material, and a top dressing of screened gravel, or that mixed with bank gravel, should binding material be defective, is then spread and rolled, which completes the repair. The roller is preceded by a watering cart to insure compaction. When the road to be repaired is of earth, or little better than earth, the spiking and harrowing are omitted. Advantage is taken of the removal of old material from asphalt roadways torn up for repairs to construct therefrom a class of roadway, using the methods just described, equal to the best macadam construction and at nominal cost in comparison thereto.

The designation of 6 by 20 inch curb as "standard" and of 8 by 8 inch as "special" has been eliminated from the past year's specifications. The 8 by 8 inch curb is yearly increasing its advantage over others, and the terms eliminated were misleading and false. In ground liable to settlement, however slight, such as would require the resetting of curb, or where neither roadway or pavement construction is likely to be soon placed against the new curb, the use of 6 by 20 inch curb is indicated, but otherwise the 8 by 8 inch, set on a concrete base, makes a finer appearance and is generally preferred. The cost per foot is practically the same.

Efforts to construct artificial curb have not lead to results that would indicate that it offers advantages of economy or otherwise over equivalent construction of the standard granite types. In the setting and resetting of curb, especially in the city limits, the necessity of cutting and trimming the roots of trees is of constant occurrence, and has often necessitated the reduction of a roadway's width from a former establishment to prevent injury to the trees.

The use of vitrified block in the gutters of asphalt roadways to a uniform width of about 26 inches, without toothing into the asphalt, is now the approved construction in surface work. Such construction may be omitted on steep grades, but the economy is trifling.

In connection with the circumstance that in this year's list of sheet roadways has been included for the first time about 70,000 square yards heretofore laid by private individuals in the development of suburban properties, the fact is recalled and emphasized that a sheet roadway must have a certain amount of travel to prevent rapid deterioration. The lack of this is evidenced in several of these but-little-used streets.

In the resurfacing of sheet and asphalt-block roadways which are beyond economical minor repair, a special care is given to the correction of deficiencies of longitudinal and transverse grade often found in the original pavement, whose condition is then largely due to such defects. In order to secure such correction within the *limits* of reasonable cost and under the restrictions of other constructions, which

prevent any but the most moderate change of elevation at any one point, the adherence at times to minimum rates of grade become necessary, and the consequent occasion arises for refinement of care in adherence strictly thereto in construction in order to preserve drainage conditions at every point. The uniformly good results obtained are reasons for much satisfaction with the methods used.

No new granite-block pavements are now laid and no vitrified-block roadways were laid during the past year.

The roadways heretofore specified as laid with Bermudez asphalt give every reason, by their condition, for great satisfaction with that material.

The specifications for sheet asphalt and asphalt-block roadways have been rewritten, in the view of continued experience, and are believed to be now abreast with the latest requirements.

The details of character and extent of street-roadway pavements, as given in Table H, have been carefully rewritten for this year's report, and reliance can be placed in the accuracy of its statements.

The extent of cement-sidewalk work done during the past year exceeded all former experience, due largely to the unprecedentedly low price bid for such work, which approximated the cost of brick walks. In consequence but little of the latter was laid. The details of work incident to cement-sidewalk work are very great, and unremitting care is required to avoid errors and omissions. The nature of the construction requires precision in location beyond what is usually permissible, and its permanent nature necessitates the anticipation of incidental details to an extreme degree. A request for such a walk is followed by an inspection and estimate in writing. Should this result in an order for the work, either under the assessment or permit system, the surveyor is notified to prevent loss of points of reference in the walk; the plumbing inspector, the superintendents of the sewer and water divisions, and the various gas, telephone, and electric light companies are called upon to execute any anticipated underground construction prior to the laying of the walk. A field party then stakes out the work, carefully considering its line and grade in the light of the construction's permanent character. Encroachments of structures within the space of the walk are ordered to be removed and necessary adjustments of private copings, areas, etc., are secured, either by oral notification or by formal action through the building inspector. The adjustment to grade of plumbing appurtenances in the walk are executed by a District plumber; the curb is set or reset and the walk laid by the contractor, each process under inspection from this office; the tree spaces, if new ones are necessitated, being marked out prior to the work by the parking commission. Frequently the adjustment to line and grade of manhole tops, fire hydrants, lamp-posts, and analogous constructions, and the removal or moving of telegraph and other similar poles are required and the departments charged with such work are called upon. The adjustment and reconstruction of old and the construction of the necessary new sewer catch-basins is a constant necessity which must be anticipated. After the construction of the walk its area is carefully measured, its location and extent plotted and recorded, its cost, including incidentals, determined and settlement made therefor with the contractor, and the office records are then forwarded to the accounting officers for adjustment either by rebate or assessment.

The grading and paving of alleys is conducted under the same system as the laying of sidewalks and setting of curb, but rarely are applications under the permit system received. It is generally the case that a survey for the work of paving an alley discovers a number of encroachments of private structures on public space, sometimes to a large extent. Occasionally entire buildings are found to have been constructed within or over the area of a public alley. It is not usual in the correction of these conditions to resort to litigation, as a formal notice, with reasonable insistence upon the removal of the structure, is generally successful in securing the removal of the encroaching building or fence, but occasions have arisen where the work of paving has been suspended and extreme measures inaugurated to secure public rights of occupancy.

In paving alleys the materials used during the past year, as in other recent years, have been vitrified and asphalt block. An innovation in the vitrified-block pavements has been the introduction at intervals of about 60 feet in the length of the alley pavement of expansion joints filled with asphaltic cement in order that temperature changes may be taken up at those points. Asphalt-block pavements do not require this construction, as their nature is sufficiently elastic to be dispensed with.

In the face of peculiar drawbacks the office and field work of the surface division during the past year have been carried on, it is believed, in a satisfactory manner, and my acknowledgments are due to the force engaged for the work accomplished.

Respectfully submitted.

C. B. HUNT, *Computing Engineer.*

To Capt. LANSING H. BEACH,

Corps of Engineers, U. S. A., Engineer Commissioner, D. C.

REPORT OF THE SUPERINTENDENT OF STREETS.

WASHINGTON, D. C., July 1, 1898.

CAPTAIN: I have the honor to submit herewith the following annual report for the fiscal year ended June 30, 1898:

The appropriation for "Current repairs to streets, avenues, and alleys" was \$30,000; of this amount there was expended \$29,955.38. (See Statement I.)

During the year there were 2,004 dangerous holes repaired, aggregating 10,314 square yards, at a total cost of \$4,969.50.

Statement K is a list of the work done under the permit system, under which system the property owners requesting the improvements pay one-half the total cost, the District paying the other half.

Under the act of Congress of August 7, 1894, the Commissioners of the District of Columbia are empowered, whenever, in their judgment, the public health, safety, or comfort require it, to improve and repair alleys and sidewalks and pay the total cost out of the appropriation for "Assessment and permit work." One-half the cost of the work ordered under the assessment system is charged against the abutting property and becomes a lien upon said property. Statement L gives a list of the work which was done under the assessment system, the total amount of which is \$159,976.31.

The appropriation for "Replacing curbs and sidewalks around public reservations" was \$5,000, which was entirely expended. For list of the work done under this appropriation see Statement M.

Statement O gives a list of work done for parties, which work is for their sole benefit, and which is paid for entirely by them. This work amounted to \$694.78.

Respectfully submitted.

H. N. MOSS, *Superintendent of Streets.*

To Capt. LANSING H. BEACH,
Corps of Engineers, U. S. A., Engineer Commissioner, D. C.
(Through the Computing Engineer.)

of street improvements, 1898.

RTHWEST.

	Circular curb reset.	Circular curb set.	Straight curb set.	Cost sets. per lineal foot.	Name of contractor.
	Lin. feet.	Lin. feet.	Lin. feet.	Sq.	
I.....	13.67	1,437.07	3.56	Cranford Paving Co.
Tenth.....	1,762.52	3.02	Do.
C.....	10.70	308.81	3.06	Do.
Eleven.....	6.29	580.46	5.58	Barber Asphalt Paving Co.
Twelve.....	39.95	759.02	3.37	Do.
Eleven.....	37.85	103.97	2.87	Do.
Twelve.....	72.17	1,893.26	8.52	Cranford Paving Co.
T.....	46.90	772.60	6.97	Do.
Rhode.....	21.91	15.58	377.06	0.38	Barber Asphalt Paving Co.
H.....	807.70	0.39	Cranford Paving Co.
North.....	75.45	.....	46.70	3.61	Do.

UTHWEST.

Third.....	.....	.....	139.49	8.76	Barber Asphalt Paving Co.
Six and.....	.....	.....	1,114.09	9.06	Washington Asphalt Block and Tile Co.
Virgin.....	.....	.....	268.36	8.09	Barber Asphalt Paving Co.
N.....	.....	.....	450.11	7.00	Do.
Van.....	.....	.....	1,197.11	4.59	Washington Asphalt Block and Tile Co.

UTHEAST.

E.....	.....	.....	.....	3.16	Cranford Paving Co.
Fourth.....	.....	.....	794.27	3.53	Washington Asphalt Block and Tile Co.
Ninth.....	.....	.....	446.57	9.73	Do.
D.....	.....	.....	400.34	8.50	Do.
South.....	.....	.....	.....	0.78	Warren F. Brenizer.

ORTHEAST.

F.....	.....	.....	3,517.64	36.70	Cranford Paving Co.
Florida.....	.....	.....	.....	43.01	Gaskins & Horn.
Tenth.....	.....	.....	793.17	71.77	Washington Asphalt Block and Tile Co.
Morris.....	.....	.....	.....	43.60	Do.
Fourth.....	.....	.....	.....	45.22	Cranford Paving Co.

ORGETOWN.

M.....	62.44	84.19	155.27	36.34	Barber Asphalt Paving Co.
Twelve.....	125	2,771	48.94	Day labor.
M.....	15.71	92.61	Barber Asphalt Paving Co.

Pressed brick.

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ASTOR LENOX AND
TILDEN FOUNDATION

TABLE C.—Repairs to concrete pavements, year ending June 30, 1898.

Street.	From—	To—	Year laid.	Square yards.	Contract work.	Extra work.	Total cost.	Original pavement.	Remarks.
Eleventh NW ..	H.....	I.....	1876	123,714	\$2,267.68	.....	\$2,267.68	Concrete.	Resurface.
New York avenue NW ..	Tenth.....	Eleventh.....	1872	a 30,100 b 272,055	0,046.19	\$493.69	6,479.88	.....	301 yards new pavement.
Eighteenth NW.....	P.....	Q.....	1887	177,141	4,599.75	313.69	4,999.75	do.....	New pavement.
Seventeenth NW.....	New York avenue.....	E.....	1872	244,605	5,892.97	323.87	6,221.84	do.....	New pavement on 6-inch base.
G SW.....	Four-and-a-half.....	Third.....	1888	209,982	5,109.43	435.82	5,545.25	do.....	New pavement.
Pennsylvania avenue NW, north side.	Eighteenth.....	Twenty-first.....	1875	573,697	15,422.35	823.94	16,251.29	do.....	Do.
F NW.....	Seventh.....	Fourteenth, south side	1877	.....	849.03	143.36	992.39	do.....	.....
F NW.....	Eleventh.....	Twelfth.....	1875	271,279	4,994.38	.....	566.96	do.....	Resurface.
K NW.....	Ninth.....	Tenth.....	1875	215,351	3,913.77	380.48	5,354.86	do.....	Do.
Seventeenth NW.....	P.....	Q.....	1887	.....	.....	400.28	4,323.19	do.....	.....
Four-and-a-half NW.....	Pennsylvania avenue.....	Missouri avenue.....	1886	a 90,158 b 13,599	2,913.49	305.59	3,219.08	do.....	New pavement and resurf.
N NW.....	Seventeenth.....	Eighteenth.....	1873	320,874	6,882.54	834.30	7,716.84	do.....	Resurface.
B SE.....	Intersection New Jersey avenue.....	.....	1879	12,728	297.62	7.00	304.62	Granite block.	New pavement.
Twelfth NW.....	N.....	O.....	1881	24,009	61.18	341.31	402.49	Asphalt.	Vitrified block gutters.
Eight SE.....	Intersection M.....	.....	1883	48,007	1,015.18	55.67	1,070.85	do.....	Resurface.
Second SE.....	East Capitol.....	B.....	1881	320,533	6,603.58	305.21	6,908.79	do.....	Do.
Tenth NW.....	D.....	F d.....	1885 1879	85,556	1,800.45	.....	1,800.45	do.....	Roadway widened.
Building catch basins, removing trees, lamp posts, relaying sidewalks, etc.	.....	.....	.....	.....	.....	.....	73,526.21	.....	.....
Minor repairs.....	.....	.....	.....	.....	.....	.....	3,993.62	.....	.....
Salaries.....	.....	.....	.....	.....	.....	.....	59,949.34	.....	.....
Inspection.....	.....	.....	.....	.....	.....	.....	8,067.21	.....	.....
Material.....	.....	.....	.....	.....	.....	.....	763.50	.....	.....
Total.....	.....	.....	.....	.....	.....	.....	3,700.04	.....	.....
.....	.....	.....	.....	.....	.....	.....	149,999.32	.....	.....

d D to E in 1885; E to F in 1879.

c Repairing sidewalks in connection with roadway repairs.

a New. b Resurface.

TABLE D.—Statement of character and area of street pavements, July 1, 1898.

[Square yards.]

Locality.	Asphalt.	Coal tar and concrete.	Granite.	Cobble.	Macadam.	Asphalt block.	Vitrified brick.	Gravel and unimproved.	Total.	Percentage of unimproved area.
Northwest...	1,514,791	291,754	176,684	130,119	58,007	27,280	6,885	187,970	2,393,490	7.853
Southwest...	133,511	5,110	234,904	77,342	33,713	30,504	.....	177,578	690,454	25.719
Southeast...	131,925	3,154	55,054	37,926	104,673	132,570	.....	491,977	955,071	51.512
Northeast...	189,703	8,384	19,111	1,738	62,828	136,688	.....	521,680	940,132	55.49
Georgetown	106,226	26,437	60,363	29,648	14,837	8,849	.....	47,423	288,783	16.421
Suburban...	197,648	.....	26,281	.....	491,574	7,081	.....	.....	377,584	.....
Total	2,273,504	334,839	572,397	276,773	765,632	337,972	6,885	1,426,628	5,645,514	.....

TABLE E.—Statement showing mileage of street pavements, July 1, 1898.

Locality.	Asphalt.		Coal tar and concrete.		Granite.		Macadam.		Asphalt block.	
	Linear feet.	Miles.	Linear feet.	Miles.	Linear feet.	Miles.	Linear feet.	Miles.	Linear feet.	Miles.
Northwest.....	325,009	61.55	70,552	13.36	45,097	8.54	11,418	2.16	8,415	1.60
Southwest.....	34,358	6.50	1,320	.25	56,086	10.61	7,620	1.44	8,187	1.55
Southeast.....	35,770	6.78	870	.16	14,780	2.80	27,755	5.26	31,638	6
Northeast.....	50,784	9.62	2,090	.40	4,700	.89	14,264	2.70	27,093	5.12
Georgetown.....	29,830	5.65	7,410	1.40	17,271	3.26	4,200	.80	1,500	.28
Suburban.....	53,036	10.04	.....	.....	7,450	1.41	117,726	22.30	2,030	.38
Total.....	528,787	100.14	82,242	15.57	145,384	27.51	182,983	34.66	78,863	14.93

Locality.	Vitrified brick.		Cobble.		Unimproved.		Total.	
	Linear feet.	Miles.	Linear feet.	Miles.	Linear feet.	Miles.	Linear feet.	Miles.
Northwest.....	1,070	0.20	24,297	4.61	55,594	10.50	541,452	102.52
Southwest.....	.....	.....	16,953	3.22	49,750	9.42	174,274	32.99
Southeast.....	.....	.....	12,259	2.32	123,050	23.31	246,122	46.63
Northeast.....	.....	.....	750	.14	137,143	26	236,824	44.87
Georgetown.....	.....	.....	10,640	2	13,845	2.62	84,696	16.01
Suburban.....	.....	.....	.....	.....	.....	.....	103,742	19.63
Total.....	1,070	.20	64,899	12.29	379,382	71.85	1,387,110	262.65

TABLE F.—Work done at cost of railroad companies, 1898.

Company.	Street.	From—	To—	Cost.
Capital Traction	M NW	Twenty-sixth	Rock Creek	\$77. 07
	Pennsylvania avenue.	Fourteenth	Seventeenth	270. 07
	Columbia road and Eighteenth.	.....	.....	280. 18
	Pennsylvania avenue SE., intersection of Fifth.	.....	.....	5. 43
	Pennsylvania avenue NW.	Seventeenth	Eighteenth	55. 80
	Fourteenth, corner Park.	.....	.....	4. 13
	Fifteenth and New York avenue, Fifteenth and Pennsylvania avenue, and Fourteenth and Pennsylvania avenue.	.....	.....	13. 92
	New Jersey avenue, intersection of C. Second and Pennsylvania avenue SE.	.....	.....	3. 70
				23. 31

TABLE F.—Work done at cost of railroad companies, 1898—Continued.

Company.	Street.	From—	To—	Cost.
Capital Traction.....	M NW	Twenty-sixth	Rock Creek	\$77. 07
	Repair of spike holes of temporary track.	.....	.....	206. 76
	Eighth SE., intersec- tion of M.	.....	.....	58. 60
	B SE	New Jersey avenue...	Capitol grounds	72. 55
	Second SE., intersec- tion B.	.....	.....	48. 97
	M	Thirty-first	Thirty-second	177. 55
	M	Thirty-second	Thirty-third	785. 06
	Pennsylvania avenue.	Fifteenth	Eighteenth	7. 41
	U	Seventh	Ninth	22. 11
	M	Rock Creek	Thirty-first	14. 09
				<u>1, 976. 71</u>
Metropolitan	Ninth, intersection Pennsylvania ave- nue.	.....	.....	2. 15
	F	Twelfth	Thirteenth .....	. 49
	Fourteenth	F	New York avenue ..	15. 43
	Thirty-six, intersec- tion of Prospect.	.....	.....	1. 27
	North side Lincoln park.	.....	.....	2. 45
	F	South side Twelfth...	Thirteenth .....	. 36
	Florida avenue	Eighteenth	Connecticut avenue.	12. 09
	Ninth, intersection of U.	.....	.....	7. 07
	Connecticut avenue...	Dupont Circle	Q	1. 24
	Ninth at Florida ave- nue.	.....	.....	27. 13
	Tenth at East Capitol.	.....	.....	15. 81
	F	North side Seventh ..	Tenth	3. 88
	F	South side Seventh ..	Fourteenth	1, 168. 55
	Second, intersection East Capitol.	.....	.....	38. 14
	Columbia road and Connecticut avenue.	Florida avenue	Eighteenth	2, 532. 46
	New Jersey avenue, intersection D.	.....	.....	5. 43
	Thirteenth and F in- tersection.	.....	.....	2. 40
	Connecticut avenue, Dupont Circle and M.	.....	.....	. 49
	Thirty-fifth	N	O	4. 13
	Dunbarton	Twenty-eighth	Thirty-second	5. 43
Columbia	Connecticut avenue, intersection K.	.....	.....	2. 47
	Ninth	F	G	165. 68
	Fourteenth, intersec- tion New York ave- nue.	.....	.....	5. 43
	New York avenue....	Tenth	Eleventh	<u>295. 68</u>
	Do	Fourteenth	Fifteenth	1. 24
	Massachusetts avenue	Fourth	Sixth	25. 50
	New York avenue, in- tersection of Elev- enth.	.....	.....	3. 21
	New York avenue, in- tersection of Tenth.	.....	.....	4. 45
	New York avenue, in- tersection of Twelfth	.....	.....	3. 46
	H NE	First	Fifteenth	62. 49
Belt Line	F NW., intersection of Eleventh.	.....	.....	48. 11
	New York avenue, in- tersection of Elev- enth.	.....	.....	94. 28
	Thirty-second, inter- section of M.	.....	.....	41. 74
Georgetown and Ten- nallytown.	Fourth, SE	E	G	2, 893. 00
Anacostia and Poto- mac River.	North Capitol	O	Q	4, 218. 70
Maryland and Wash- ington.	.....	.....	.....	<u>7, 691. 86</u>
Total .....	.....	.....	.....	<u>13, 688. 54</u>

TABLE G.—*Street railways in the District of Columbia July 1, 1898.*

Name of company.	Motive power.	Mileage operated.			
		Tracks owned by company.		Tracks owned by other companies.	
		Double.	Single.	Double.	Single.
		<i>Miles.</i>	<i>Miles.</i>	<i>Miles.</i>	<i>Miles.</i>
Capital Traction	Underground and overhead electric.	16.83	.....	.....	.....
Metropolitan	Underground electric.....	10.21	3.70	.....	.....
Columbia.....	Cable	2.86	.....	.....	.....
Eckington and Soldiers' Home.	Overhead electric and horse.	7.18	1.57	.89	.23
Belt Line	Horse	5.90	1.22	.28	.....
Brightwood	Overhead electric.....	4.60	1.90	.....	.....
Georgetown and Tennallytown	.....do	4.30	.....	.....	.....
Anacostia and Potomac River.	Horse	5.42	.23	1.27	.....
Washington and Great Falls.	Overhead electric.....	3.70	.....	.....	.....
Washington, Alexandria, and Mount Vernon.	Underground electric.....	6.90	.83	.....	.....
Maryland and Washington....	Overhead electric	2.28	.....	.....	.....
Capital.....	Underground and overhead electric.	.....	1.32	1.22	.20
Baltimore and Washington Transit.	Overhead electric.....	.....	.43	.....	.....
Washington and Glen Echo....	.....do .....	.16	.....	.....	.....
Total.....	.....	63.73	10.70	3.66	.43

a New electric construction of Belt Line tracks on Fourteenth street.

b Capital Railway adapted Anacostia tracks to electric system.

TABLE H.—Statement of character and extent of street pavements July 1, 1898.
NORTHWEST.

Locality.	Carrisagway.										Resurfaced; originally paved with—
	Length.	Width.	Asphalt.	Coal tar and con- crete.	Granite.	Cobble and blue rock.	Macadam.	Asphalt block.	Gravel and num- bered.	Year paved.	Year resurfaced.
North Capital street, from B (west side) to C.....	Feet. 480	Feet. 50	Sq. yds. 1,365	Sq. yds. 1,928	Sq. yds. 1,198	Sq. yds. 1,050	Sq. yds. 1,050	Sq. yds. 1,050	Sq. yds. 1,050	1888	.....
North Capital street, from C (west side) to D.....	400	50	.....	.....	.....	.....	.....	.....	.....	.....	.....
North Capital street, from D (west side) to E.....	400	50	.....	.....	.....	.....	.....	.....	.....	.....	.....
North Capital street, from E (west side) to Massachu- setts avenue.	540	50	.....	.....	.....	.....	.....	.....	.....	.....	.....
North Capital street, from Massachusetts avenue (west side) to I street.	1,390	50	3,728	.....	.....	.....	.....	.....	.....	1887	.....
North Capital street, from I (west side) to K.....	440	50	1,443	.....	.....	.....	.....	.....	.....	.....	.....
North Capital street, from K (west side) to M.....	1,130	50	3,103	.....	.....	.....	.....	.....	.....	1889	.....
North Capital street, from M (west side) to New York avenue.	500	50	1,103	.....	.....	.....	.....	.....	.....	1892	.....
North Capital street, from New York avenue (west side) to O street.	445	50	863	.....	.....	.....	.....	.....	.....	1893	.....
North Capital street, from O to Florida avenue.....	720	50	548	.....	.....	.....	.....	.....	.....	.....	.....
Alabama street, between New Jersey avenue and First, B and C streets.	470	25	.....	.....	.....	.....	.....	.....	.....	.....	.....
First street, from center of Botanical Garden to Penn- sylvania avenue.	440	.....	2,270	.....	.....	.....	.....	.....	.....	1883	1895
First street, from Pennsylvania avenue to F street.....	2,240	55 { 40	.....	.....	.....	.....	.....	.....	.....	.....	.....
First street, from F to H.....	620	32	.....	.....	.....	.....	.....	.....	.....	.....	.....
First street, from H to Defrees.....	170	32	.....	.....	.....	.....	.....	.....	.....	.....	.....
First street, from Defrees to I.....	150	32	.....	.....	.....	.....	.....	.....	.....	.....	.....
First street, from I to K.....	390	32	1,191	.....	.....	.....	.....	.....	.....	.....	.....
First street, from K to Pierce.....	686	32	3,051	.....	.....	.....	.....	.....	.....	.....	.....
First street, from Pierce to Florida avenue.....	2,504	32	6,158	.....	.....	.....	.....	.....	.....	.....	.....
Second street, from Pennsylvania avenue to Indiana avenue.	860	40	.....	.....	.....	.....	.....	.....	.....	.....	.....
Second street, from Indiana avenue to I street.....	2,900	40	10,452	.....	.....	.....	.....	.....	.....	.....	.....
Kirby street, between First and Third, M and N.....	480	32	.....	.....	.....	.....	.....	.....	.....	.....	.....
Third street, from center of Botanical Garden to Penn- sylvania avenue.	500	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....

^a Vitrified brick.

^b Paved from O to P.

TABLE H.—Statement of character and extent of street pavements July 1, 1898—Continued.

NORTHWEST—Continued.

Locality.	Carriageway.										Resurfaced: originally paved with—
	Length.	Width.	Asphalt.	Coal tar and concrete.	Granite.	Cobble and blue rock.	Macadam.	Asphalt block.	Gravel and unimproved.	Year paved.	Year resurfaced.
Third street, from Pennsylvania avenue to D street.....	<i>Feet.</i> 1, 186	32	436		4, 251				<i>Sq. yds.</i>	1880	
Third street, from intersection of D.....	32									1880	
Third street, from Indiana avenue to L street.....	32	436								1884	Coal tar.
Third street, from Indiana avenue to L street.....	32	436								1884	
Third street, from Indiana avenue to New York avenue.....	500	40	16, 859							1875	
Third street, from New York avenue to New York avenue.....	500	40	2, 885							1875	
Third street, from New York avenue to F street.....	850	35	4, 177							1893	
Third street, from F to Florida avenue.....	1, 207	35							4, 706		
Fourth street, from Indiana avenue to New York avenue.....	2, 610	32	3, 573	10, 719						1872	Do.
Fourth street, from New York avenue to M street.....	230	32								1873	
Fourth street, from M to New Jersey avenue.....	1, 170	32			2, 401	647				1891	
Fourth street, from New Jersey avenue to Florida avenue.....	1, 530	30	5, 594							1891	
Fourth and a-half street, from center of Mall to Pennsylvania avenue, (a).....	720	55	2, 106	1, 534						1886	
Fourth and a-half street, from Pennsylvania avenue to D street.....	760	50						4, 549		1889	
Fifth street, from D to G.....	1, 240	46	3, 341							1885	
Fifth street, from G to New York avenue.....	980	32		7, 389						1873	Do.
Fifth street, from New York avenue to O street.....	1, 620	32	5, 666							1873	
Fifth street, from O to Q.....	850	32	3, 123							1879	
Fifth street, from Q to Florida avenue.....	1, 360	32	4, 436							1889	
Sixth street, from center of Mall to Missouri avenue.....	670	60				3, 333				1889	
Sixth street, from Missouri avenue to Louisiana avenue.....	850	60	5, 073							1885	
Sixth street, from Louisiana avenue to Louisiana avenue.....	550	32	3, 791	2, 106						1877	Do.
Sixth street, from E to F.....	470	32	1, 313							1873	Asphalt.
Sixth street, from F to G.....	240	32		975						1889	Surface asphalt binder.
Sixth street, from G to New York avenue.....	1, 790	35	6, 896							1880	
Sixth street, from New York avenue to Florida avenue.....	4, 240	35	16, 636							1880	

a New, Missouri avenue to Pennsylvania avenue.

Madison street, between Sixth and Seventh, M and N	540	25	1,538	.....	.....	.....	1889	.....	.....
Marion street, between Sixth and Seventh, P and R	1,010	26	2,861	.....	.....	.....	1889	.....	.....
Wilberger street, between Sixth and Seventh, S and T	500	20	.....	.....	1,730	.....	1878	.....	.....
Seventh street, from center of Mall to Pennsylvania avenue	11,500	51	.....	4,338	.....	.....	.....	.....	(Granite (west side). (Granite (east side)).
Seventh street, from Pennsylvania avenue to D street	450	51	1,579	.....	.....	.....	1879	.....	.....
Seventh street, Market space to D (west side)	260	.....	.....	520	.....	.....	.....	.....	.....
Seventh street, from intersection of Louisiana avenue .....	.....	.....	.....	.....	.....	.....	1879	.....	.....
Seventh street, from D to Q	5,870	49	.....	18,465	.....	.....	.....	.....	.....
Seventh street, from Q to Florida avenue	1,860	51	.....	{ 3,902 3,816 }	.....	.....	{ 1882 1889 }	.....	.....
Seventh street, from intersection of E to Q	700	51	.....	5,597	.....	.....	1877	.....	.....
Eighth street, from Pennsylvania avenue to E street	330	51	.....	3,653	.....	.....	1881	.....	.....
Eighth street, from E to F	1,650	30	1,964	.....	.....	.....	1877	.....	Coal tar.
Eighth street, from G to L	1,070	30	4,890	.....	.....	.....	1883	.....	.....
Eighth street, from L to N	1,070	30	3,610	.....	.....	.....	1875	.....	Do.
Eighth street, from N to R	1,940	30	6,493	.....	.....	.....	1883	.....	.....
Eighth street, from R to S	530	30	.....	2,063	.....	.....	1887	.....	.....
Eighth street, from S to Florida avenue	920	30	.....	3,624	.....	.....	1888	.....	.....
Ninth street, from B to Pennsylvania avenue	500	51	.....	2,260	.....	.....	1879	.....	.....
Ninth street, from Pennsylvania avenue to P street	5,610	51	32,363	.....	.....	.....	.....	.....	.....
Ninth street, from P to Rhode Island avenue	670	51	1,538	.....	.....	.....	1892	.....	Do.
Ninth street, from Rhode Island avenue to Florida avenue	3,000	51	3,371	.....	.....	.....	1883	.....	.....
Ninth street, from P to Florida avenue	480	51	6,147	.....	.....	.....	1875	.....	.....
Columbia street, between Ninth and Tenth, Q and O .....	.....	.....	.....	2,683	.....	.....	1873	.....	.....
Opera square, between Ninth and Tenth streets, Pennsylvania avenue and Louisiana avenue .....	.....	.....	.....	784	.....	.....	.....	.....	.....
Tenth street, from B to Pennsylvania avenue	740	51	.....	3,103	.....	.....	1872	.....	.....
Tenth street, from Pennsylvania avenue to E street	366	45	2,063	.....	.....	.....	1885	.....	Widened to 45 feet.
Tenth street, from E to F	380	45	2,124	.....	.....	.....	1879	.....	Do.
Tenth street, from F to G	300	32	955	.....	.....	.....	1880	.....	.....
Tenth street, from G to K	1,200	32	4,828	.....	.....	.....	1875	.....	Do.
Tenth street, from K to M	980	32	3,368	.....	.....	.....	1880	.....	.....
Tenth street, from M to O	1,020	32	3,443	.....	.....	.....	1881	.....	.....
Tenth street, from O to R	1,420	32	4,433	.....	.....	.....	1883	.....	.....
Tenth street, from R to S	530	32	1,992	.....	.....	.....	1887	.....	.....
Tenth street, from S to T	500	32	1,948	.....	.....	.....	1891	.....	.....
Tenth street, from T to U	500	32	2,588	.....	.....	.....	1895	.....	.....
Tenth street, from U to Florida avenue	980	32	.....	.....	3,908	.....	.....	.....	.....
Eleventh street, from B to Pennsylvania avenue	580	55	3,855	.....	.....	.....	1872	.....	Cobble removed.
Eleventh street, from Pennsylvania avenue to E street	430	55	2,500	.....	.....	.....	1878	.....	.....
Eleventh street, from K to F	362	55	.....	1,734	.....	.....	1879	.....	.....
Eleventh street, from F to G	266	55	.....	1,214	.....	.....	1880	.....	.....
Eleventh street, from G to K	1,330	{ 55 35 }	1,297	3,966	.....	.....	1875	.....	Resurfaced H to I.

TABLE H.—Statement of character and extent of street pavements July 1, 1898—Continued.
NORTHWEST—Continued.

Locality.	Carriageway.										Resurfaced, originally paved with—
	Length.	Width.	Asphalt.	Coal tar and con-crete.	Granite.	Cobble and blue rock.	Macadam.	Asphalt block.	Gravel and unim-proved.	Year paved.		Year resurfaced.
Eleventh street, from K to O.....	Feet. 85	32	Sq. yds. 1, 528	Sq. yds. 4, 047	Sq. yds. 1, 528	Sq. yds.	Sq. yds.	Sq. yds.	Sq. yds.	1889	.....
Eleventh street, from O to Florida avenue.....	1, 190	35	8, 734	.....	.....	.....	.....	.....	.....	1891	.....
Twelfth street, from center of Mall to B street.....	4, 000	35	8, 734	.....	.....	.....	.....	.....	.....	1873	.....
Twelfth street, from B to Pennsylvania avenue.....	840	40	1, 911	.....	2, 355	.....	.....	.....	.....	1872	.....
Twelfth street, from Pennsylvania avenue to E street.....	850	40	1, 911	.....	2, 355	.....	.....	.....	.....	1878	.....
Twelfth street, from E to F.....	320	38	1, 292	.....	1, 629	.....	.....	.....	.....	1896	.....
Twelfth street, from F to N.....	420	38	1, 292	.....	1, 629	.....	.....	.....	.....	1879	.....
Twelfth street, from N to O.....	3, 500	32	8, 892	4, 047	.....	.....	.....	.....	.....	1875	.....
Twelfth street, from intersection of G.....	.....	.....	198	.....	.....	.....	.....	.....	.....	1881	.....
Twelfth street, from N to O.....	430	32	1, 522	.....	.....	.....	.....	.....	.....	1881	.....
Twelfth street, from O to Rhode Island avenue.....	530	32	1, 859	.....	.....	.....	.....	.....	.....	1883	.....
Twelfth street, from Rhode Island avenue to Vermont avenue.....	660	32	2, 304	.....	.....	.....	.....	.....	.....	1887	.....
Twelfth street, from Vermont avenue to S street.....	500	32	1, 798	.....	.....	.....	.....	.....	.....	1888	.....
Twelfth street, from S to V.....	1, 460	32	5, 377	.....	.....	.....	.....	.....	.....	1890	.....
Twelfth street, from V to Florida avenue.....	1, 900	32	3, 554	.....	.....	.....	.....	.....	.....	1891	.....
Cleveland street, between Twelfth and Thirteenth, W and Florida avenue.....	500	25	.....	.....	.....	.....	.....	1, 237	.....	1886	.....
Thirteenth street, from B to C.....	400	40	1, 760	.....	.....	.....	.....	.....	.....	1878	.....
Thirteenth street, from C to Pennsylvania avenue.....	700	40	3, 087	.....	.....	.....	.....	.....	.....	1878	.....
Thirteenth street, from Pennsylvania avenue to E street.....	150	40	.....	676	.....	.....	.....	.....	.....	1878	.....
Thirteenth street, from E to F.....	400	40	.....	.....	1, 741	.....	.....	.....	.....	1879	.....
Thirteenth street, from F to P.....	4, 150	32	.....	15, 682	.....	.....	.....	.....	.....	1873	.....
Thirteenth street, from P to Corcoran.....	600	32	2, 126	.....	.....	.....	.....	.....	.....	1881	.....
Thirteenth street, around Iowa circle.....	1, 313	32	8, 838	.....	.....	.....	.....	.....	.....	1873	.....
Thirteenth street, from Corcoran to T.....	1, 810	32	4, 373	.....	.....	.....	.....	.....	.....	1884	.....
Thirteenth street, from T to Florida avenue.....	1, 800	32	7, 271	.....	.....	.....	.....	.....	.....	1891	.....
Thirteenth street, from intersection of N.....	.....	32	613	.....	.....	.....	.....	.....	.....	1879	.....
Thirteenth street, from intersection of B.....	.....	32	775	.....	.....	.....	.....	.....	.....	1879	.....
Kingma place, between Thirteenth and Fourteenth, P and Q streets.....	500	30	1, 660	.....	.....	.....	.....	.....	.....	1886	.....

Thirteen-and-a-half street, from B street north to Pennsylvania avenue.	1,300	35	.....	.....	.....	5,095	.....	.....	1872	Coal tar.
Fourteenth street, from center of Mall to B street north.	775	40	.....	3,920	.....	.....	.....	.....	1873	Do.
Fourteenth street, from B street north to Pennsylvania avenue.	1,340	70	.....	8,852	.....	.....	.....	.....	1887	Do.
Fourteenth street, from Pennsylvania avenue to F street.	320	70	.....	.....	1,754	.....	.....	.....	1884	Asphalt (east side).
Fourteenth street, from F to New York avenue.	660	70	.....	3,732	.....	.....	.....	.....	1873	Asphalt (west side).
Fourteenth street, from New York avenue to H.	270	70	.....	1,549	.....	.....	.....	.....	1881	.....
Fourteenth street, from H to Florida avenue.	.....	.....	.....	29,086	.....	.....	.....	.....	1879	.....
Fourteenth street, from H to M.	1,800	70	.....	.....	5,082	.....	.....	.....	1883	.....
Fourteenth street, from M to Florida avenue.	5,060	70	.....	.....	14,583	.....	.....	.....	1882	.....
Johnson street, from Fourteenth (R and S) to Fifteenth.	500	30	.....	.....	1,446	.....	.....	.....	1889	.....
Portner street, between Fourteenth and Fifteenth, W and V.	370	25	.....	.....	.....	1,025	.....	.....	1888	.....
Fifteenth street, from B to Pennsylvania avenue a.	1,520	43	.....	.....	5,992	.....	61,020	5,220	1883	Asphalt block.
Fifteenth street, from Pennsylvania avenue to New York avenue.	900	70	.....	.....	4,938	.....	.....	.....	1872	New asphalt on 8-inch hydraulic base.
Fifteenth street, from New York avenue to Vermont avenue.	1,260	40	.....	.....	7,005	.....	.....	.....	1873	Coal tar.
Fifteenth street, from I to K.	300	40	.....	.....	1,724	.....	.....	.....	1879	Do.
Fifteenth street, from K to Rhode Island avenue.	1,850	32	.....	.....	6,921	.....	.....	.....	1880	Do.
Fifteenth street, from Rhode Island avenue to S street.	2,200	32	.....	.....	4,420	.....	.....	.....	1887	Do.
Fifteenth street, from S to U.	1,100	32	.....	.....	3,768	.....	.....	.....	1885	.....
Fifteenth street, from U to V.	450	32	.....	.....	1,546	.....	.....	.....	1885	.....
Fifteenth street, from V to Florida avenue.	450	32	.....	.....	.....	.....	1,260	.....	1889	.....
Executive avenue, south and west to Treasury Department.	1,195	.....	.....	.....	5,601	.....	.....	.....	1884	.....
Fifteen-and-a-half street, from Pennsylvania avenue to H street.	465	40	.....	.....	2,974	.....	.....	.....	1872	Do.
Sixteenth street, from H to Scott circle.	2,250	50	.....	.....	12,450	.....	.....	.....	1881	.....
Sixteenth street, from Scott circle to R street.	1,745	50	.....	.....	10,818	.....	.....	.....	1882	.....
Sixteenth street, from R to Florida avenue c.	2,065	50	.....	.....	13,391	.....	.....	.....	1883	.....
Sixteen-and-a-half street, from Pennsylvania avenue to H street.	465	40	.....	.....	2,315	.....	.....	.....	1872	Do.
Seventeenth street, from B to New York avenue.	1,040	50	.....	.....	2,246	.....	6,839	.....	1872	New pavement New York avenue to E street.
Seventeenth street, from New York avenue to I street.	1,560	50	.....	.....	4,847	.....	.....	.....	1884	Coal tar.
Seventeenth street, from I to Massachusetts avenue.	2,535	50	.....	.....	.....	.....	4,758	.....	1880	.....
Seventeenth street, from Massachusetts avenue to P street.	580	32	.....	.....	.....	.....	10,603	.....	1886	.....
Seventeenth street, from P to Q.	500	32	.....	.....	.....	.....	2,095	.....	1894	Do.
Seventeenth street, from Q to R.	800	32	.....	.....	.....	.....	.....	.....	1878	.....
Seventeenth street, from R to T.	850	32	.....	.....	.....	.....	.....	.....	1875	.....
Seventeenth street, from T to Florida avenue.	1,050	32	.....	.....	.....	.....	.....	.....	1884	.....
a Asphalt surface on asphalt block.	.....	.....	.....	.....	.....	.....	.....	.....	1887	.....
b Vitrified brick.	.....	.....	.....	.....	.....	.....	.....	.....	1889	.....
c Intersection of U street repaved and Hancock circle removed 1894.	.....	.....	.....	.....	.....	.....	.....	4,076	.....	.....

TABLE H.—Statement of character and extent of street pavements July 1, 1898—Continued.

NORTHWEST—Continued.

Locality.	Carriageway.										Resurfaced; originally paved with—
	Length.	Width.	Asphalt.	Coal tar and con-crete.	Granite.	Cobble and blue rock.	Macadam.	Asphalt block.	Gravel and unim-proved.	Year paved.		Year resurfaced.
	Feet.	Feet.	Sq. yds.	Sq. yds.	Sq. yds.	Sq. yds.	Sq. yds.	Sq. yds.	Sq. yds.		
Eighteenth street, from river to D.....	800	32							Sq. yds. 2, 473		
Eighteenth street, from D to E.....	360	32	1, 544							1892	
Eighteenth street, from E to New York avenue.....	200	32		1, 096						1873	Coal tar.
Eighteenth street, from New York avenue to Pennsyl- vania avenue.....	1, 170	32	4, 885							1881	
Eighteenth street, from Pennsylvania avenue to K street.....	920	32	4, 515							1872	Do.
Eighteenth street, from K to L.....	400	32						1, 431		1886	
Eighteenth street, from L to P.....	1, 950	32	7, 048	576						1873	Do.
Eighteenth street, from P to Q.....	500	32	1, 771	1, 764						1887	{ 1879 1873 1897 }
Eighteenth street, from Q to S.....	850	32	8, 130							1891	1898
Eighteenth street, from S to Florida avenue.....	940	32	8, 823							1893	
Nineteenth street, from river to E.....	1, 190	32							4, 200		
Nineteenth street, from E to New York avenue.....	225	32				1, 028					
Nineteenth street, from New York avenue to Pennsyl- vania avenue.....	1, 370	32		6, 421						1873	Do.
Nineteenth street, from Pennsylvania avenue to K street.....	655	32			8, 170					1880	
Nineteenth street, from K to M.....	1, 010	32			2, 726					1885	
Nineteenth street, from M to N.....	520	32			1, 894					1882	
Nineteenth street, from N to Dupont circle.....	570	32	2, 409							1881	1895
Nineteenth street, from Dupont circle to Florida avenue.....	2, 000	32	2, 841	4, 757						1873	Do.
Twentieth street, from river to E street.....	1, 450	32									
Twentieth street, from E to Pennsylvania avenue.....	1, 550	32		5, 579					5, 150	1873	Do.
Twentieth street, from Pennsylvania avenue to I street.....	160	32	981							1879	
Twentieth street, from I to K.....	375	32			1, 850					1879	
Twentieth street, from K to P.....	2, 425	32	8, 200							1873	Do.
Twentieth street, from P to Connecticut avenue.....	315	32	2, 167							1873	{ 1894 1896 1899 }
Twentieth street, from E to S.....	506	32	1, 995							1873	Paved on cobble.

TABLE H.—Statement of character and extent of street pavements July 1, 1898—Continued.

NORTHWEST—Continued.

Locality.	Carriageway.										Resurfaced; original; paved with—
	Length.	Width.	Asphalt.	Coal tar and con- crete.	Granite.	Cobble and blue rock.	Macadam.	Asphalt block.	Gravel and unim- proved.	Year paved.	Year resurfaced.
B street, from Twelfth to Seventeenth.....	Feet. 3,150	60	Sq. yds. 2,050	Sq. yds. 3,050	Sq. yds. 23,581	Sq. yds. 567	Sq. yds.	Sq. yds.	Sq. yds.	1874	
B street, from Seventeenth to Twenty-third.....	3,050	35									
Little B street, from Tenth to Twelfth.....	560	{ 46 }									
C street, from North Capitol to First.....	700	{ 46 }			3,802					1879	
C street, from Second to Third.....	450	32			1,291					1882	
C street, from Third to Four-and-a-half.....	610	30	2,054							1882	
C street, from Four-and-a-half to Seventh.....	1,000	42	4,904							1885	
C street, from Seventh to Eighth.....	250	46			1,183					1879	
C street, from Eighth to Ninth.....	470	40			1,656					1872	
C street, from Ninth to Tenth.....	1,420	40	903			5,400				1898	
C street, from Tenth to Fifteenth.....	3,000	32							10,453		
C street, from Seventeenth to Twenty-third.....	470	35			1,617					1894	
D street, from North Capitol to New Jersey avenue.....	1,470	36	3,412	406						1875	Coal tar.
D street, from New Jersey avenue to Fourth street.....	1,110	35	275							1889	
D street, from Fifth to Sixth.....	1,540	36	936		5,842					1879	Asphalt on granite.
D street, from Sixth to Tenth.....	1,990	40				3,904				1873	Asphalt on cobble.
D street, from Tenth to Fourteenth.....	370	40	1,675							1891	
D street, from Fourteenth to Fifteenth.....	660	35	2,788						7,825	1887	Coal tar.
D street, from Seventeenth to Eighteenth.....	2,200	32								1879	Asphalt.
D street, from Eighteenth to Twenty-third.....	2,620	35	2,494							1878	
E street, from North Capitol to New Jersey avenue.....	1,300	35	4,932							1889	Asphalt on cobble.
E street, from New Jersey avenue to Fourth street.....	2,160	35	9,323							1883	Coal tar.
E street, from Fifth to Eleventh.....	580	40								1889	Asphalt.
E street, from Eleventh to Thirteenth.....	300	35		2,487						1879	
E street, from Thirteenth to Fourteenth.....	750	35	3,031					1,093		1886	Asphalt block.
E street, from Pennsylvania avenue to Fifteenth.....	{ 450 }	35		1,642		3,319				1889	Asphalt on cobble.
E street, from Seventeenth to Nineteenth.....	{ 1,030 }									1873	
E street, from Nineteenth to Twenty-second.....	1,400	35				5,500				{ 1872 }	
E street, from Twenty-second to river.....	2,050	35								{ 1873 }	
F street, from North Capitol to New Jersey avenue.....	2,750	35		2,962					8,000	1897	

TABLE H.—Statement of character and extent of street pavements July 1, 1898—Continued.
NORTHWEST—Continued.

Locality.	Carriageway.										Resurfaced; originally paved with—	
	Length.	Width.	Asphalt.	Coal tar and con-crete.	Granite.	Cobble and blue rock.	Macadam.	Asphalt block.	Gravel and unim-proved.	Year paved.		Year resurfaced.
I street, from Tenth to Eleventh.....	Feet. 200	33	Sq. yds. 714	Sq. yds.	Sq. yds.	Sq. yds.	Sq. yds.	Sq. yds.	Sq. yds.	1886	1878	Coal tar.
I street, from Eleventh to Thirteenth.....	670	40	3,700							1872	1884	Do.
I street, from Thirteenth to Fifteenth.....	1,000	40	4,632							1874	{ 1884 1878 }	
I street, from Fifteenth to Seventeenth.....	1,500	48	8,322							1873	{ 1884 1878 }	Do.
I street, from Seventeenth to Eighteenth.....	640	40	2,672							1880	1880	
I street, from Pennsylvania avenue to Twenty-third street.	2,145	38	6,296							1891	1891	Macadamized.
I street, from Twenty-third to Twenty-seventh.....	1,275	38	5,385				1,500			{ 1897 1886 }	{ 1897 1886 }	Cobble.
I street, from Eighteenth to Pennsylvania avenue.....	1,200	40	5,327							1896	1896	
K street, from North Capitol to First.....	871	50	3,984			4,838				1874	1874	Coal tar.
K street, from First to Third.....	679	50	3,984							1894	{ 1878 1889 }	
K street, from Third to Seventh.....	1,820	50	4,175	4,209						1873	{ 1881 1896 }	Do.
K street, from Seventh to Ninth.....	1,460	53	9,315							1884	{ 1889 1894 }	
K street, from intersection of Vermont avenue.....	717	30	717							1875	{ 1893 1896 }	Do.
K street, from Ninth to Eighteenth.....	4,990	50	27,551							1890	1896	
K street, from Eighteenth to Twenty-third.....	2,160	50	11,671		619					1874	1880	Do.
K street, from Twenty-third to Twenty-eighth.....	1,810	32	4,643		12,571					1880	1890	
L street, from North Capitol to New Jersey avenue.....	1,400	32	4,643							1877	1877	Do.
L street, from New Jersey avenue to Fourth street.....	550	32	1,592		2,665					1877	{ 1887 1880 }	
L street, from Fourth to Fifth.....	750	32								1877	1891	Do.
L street, from Fifth to Sixth.....	240	32								1877	{ 1887 1880 }	
L street, from Sixth to Seventh.....	4,040	32	21,208							1877	1883	Do.
L street, from Connecticut avenue to Twentieth street.....	1,390	32	2,645							1883	1883	
L street, from Sixth to Eighth.....	740	32	2,645							1878	1883	Do.
L street, from Seventeenth to Connecticut avenue.....	880	32	1,628							1889	1889	
L street, from Twentieth to Twenty-fifth.....	2,945	32	8,141							1889	1889	Do.
L street, from Twenty-fifth to Twenty-sixth.....	210	32	483							1889	1889	
L street, from Twenty-sixth to Twenty-seventh.....	386	32	1,175							1889	1889	

Do Sales street, between L and M, Seventeenth and Connecticut avenue.	550	32	2, 493	1875	1875
Pierstreet, between L and M, New Jersey avenue and North Capitol street.	1, 500	40	5, 535	1889	1889
M street, from North Capitol to First.	870	35	3, 067	1894	1894
M street, from First to New Jersey avenue.	720	35	2, 597	1880	1880
M street, from New Jersey avenue to Sixth street.	1, 400	35	5, 564	1880	1880
M street, from Sixth to Fourteenth.	2, 200	35	13, 147	1879	1894
M street, from Fourteenth to Sixteenth.	1, 100	40	4, 573	1881	1894
M street, from Sixteenth to Eighteenth.	1, 300	40	4, 552	1873	1878
M street, from Eighteenth to New Hampshire avenue.	1, 570	40	6, 084	1879	1886
M street, from New Hampshire avenue to Rock Creek.	2, 125	40	9, 171	1882	1886
Jefferson street, between M and N, Eighteenth and Nineteenth.	450	27	61, 393	1884	1884
Ridge street, between M and N, Fourth and Fifth.	760	30	2, 518	1879	1879
Ward place, between New Hampshire avenue and Twenty-second street, M and N.	545	50	1, 505	1892	1892
N street, from North Capitol to New Jersey avenue.	1, 800	32	5, 642	1893	1893
N street, from New Jersey avenue to Fifth street.	830	32	3, 311	1890	1890
N street, from Fifth to Ninth.	1, 300	32	4, 454	1883	1883
N street, from Ninth to Fourteenth.	2, 190	32	6, 862	1880	1880
N street, from Fourteenth to Sixteenth.	910	32	3, 249	1881	1881
N street, from Sixteenth to New Hampshire avenue.	2, 245	32	6, 556	1873	1878
N street, from New Hampshire avenue to Twenty-first street.	260	32	517	1875	1875
N street, from Twenty-first to Twenty-second.	620	32	2, 081	1893	1893
N street, from Twenty-second to Twenty-fourth.	710	32	2, 196	1892	1892
N street, from Twenty-fourth to Rock Creek.	810	32	2, 394	1885	1885
Sunderland place, between N and O, Nineteenth and Twentieth streets.	380	30	61, 185	1892	1892
Morgan street, between M and N, First and Third.	380	30	1, 307	1875	1881
O street, from North Capitol to New Jersey avenue.	1, 800	32	5, 237	1875	1881
O street, from New Jersey avenue to Thirteenth street.	2, 700	32	7, 860	1885	1885
O street, from Thirteenth to Vermont street.	530	32	1, 663	1875	1875
O street, from Fifteenth to Sixteenth.	520	32	1, 697	1885	1885
O street, from Sixteenth to Seventeenth.	520	32	2, 011	1887	1887
O street, from Seventeenth to Twenty-first.	500	32	2, 388	1886	1886
O street, from Twenty-first to Twenty-second.	200	32	693	1891	1891
P street, from Twenty-second to Rock Creek.	1, 670	32	7, 135	1891	1891
P street, from North Capitol to Fourth.	2, 030	32	5, 166	1884	1884
P street, from Fourth to Ninth.	2, 660	32	8, 156	1884	1884
P street, from Ninth to Fifteenth.	2, 660	32	500	1884	1884
P street, from Fifteenth to Eighteenth.	1, 500	32	8, 076	1879	1879
P street, from Eighteenth to Twentieth.	450	32	1, 295	1873	1878
P street, from Twentieth to Twenty-second.	1, 120	40	3, 481	1885	1885
P street, from Twenty-second to Rock Creek.	300	40	1, 079	1872	1887

b 1895, Seventeenth to Eighteenth.

a Permit work.

b Asphalt on cobble.

a Asphalt on macadam.

TABLE H.—Statement of character and extent of street pavements July 1, 1898—Continued.

NORTHWEST—Continued.

Locality.	Carriageway.										Resurfaced; originally paved with—
	Length.	Width.	Asphalt.	Coal tar and concrete.	Granite.	Cobble and blue rock.	Macadam.	Asphalt block.	Graded and unimproved.	Year paved.	Year resurfaced.
Medison street, between Seventeenth and Eighteenth, P and Q.	Feet. 807	25	Sq. yds. 2, 271						Sq. yds.	1893	1892
Sapoon street, between Fourteenth and Fifteenth, P and Q.	680	24	1, 733							1890	
Franklin street, between P and Q, New Jersey avenue and Fifth.	630	30							1, 667		
Bates street, between P and Q, North Capitol and First.	840	25							1, 800		
Madison street, between P and Q, Fifteenth and Seventeenth.	840	25		2, 374						1875	
Q street, from Florida avenue to Third.	1, 470	32							5, 151		
Q street, from Third to New Jersey avenue.	420	32	1, 812							1890	
Q street, from New Jersey avenue to Fifth.	580	32	2, 031							1893	
Q street, from Fifth to Sixth.	270	32	833							1890	
Q street, from Sixth to Rhode Island avenue.	1, 300	32	2, 104	2, 655						1887	1895
Q street, from Rhode Island avenue to Vermont avenue.	800	32	2, 453							1889	
Q street, from Vermont avenue to Fourteenth.	850	32	2, 806							1883	
Q street, from Fourteenth to Sixteenth.	1, 250	32	2, 338	2, 468						1874	{ 1886 1891 }
Q street, from Sixteenth to Seventeenth.	550	32	1, 890							1875	1889
Q street, from Seventeenth to Nineteenth.	1, 400	32	4, 904							1893	1895
Q street, from Nineteenth to Twentieth.	860	32		862						1873	{ 1873 1882 }
Q street, from Twentieth to Twenty-second.	970	32		2, 541						1896	
Q street, from Twenty-first to Massachusetts avenue.	80	32		883						1875	
Hwyer street, between Q and R, Twentieth and Twenty-first.	470	27						1, 553		1884	
Warner street, between New Jersey avenue and Fifth, Q and R.	470	25							1, 333		
Corcoran street, between Thirteenth and Fourteenth, Q and R.	554	30	2, 067							1897	1895
Corcoran street, between Fourteenth and Fifteenth, Q and R.	630	30		2, 120						1875	

Corcoran street, between Fifteenth and New Hampshire avenue, Q and R.	1, 820	30	4, 851						1888	
Corcoran street, between Eighteenth and Nineteenth, Q and R.	470	30	1, 163						1890	
R street, from Florida avenue to Seventh.	2, 410	32	7, 551						1890	Do.
R street, from Seventh to Ninth.	530	32		1, 602					1888	1894
R street, from Ninth to Fourteenth.	2, 220	32	7, 638						1884	Do.
R street, from Fourteenth to Sixteenth.	1, 250	32		4, 502					1875	1896
R street, from Sixteenth to New Hampshire avenue.	1, 140	32	3, 918						1890	
R street, from New Hampshire avenue to Twentieth street.	1, 150	32	8, 498						1891	
R street, from Twentieth to Twenty-first.	400	32		1, 411					1887	
R street, from Twenty-first to Florida avenue.	250	32	785						1893	
Riggs street, between R and S, to Eighteenth and Nineteenth.	450	32						1, 300		
Riggs street, between R and S, to Sixteenth and Seventeenth.	500	30	1, 620						1891	
Riggs street, between R and S, to Thirteenth and Fourteenth.	625	30				2, 030			1886	
French street, between R and S, to Ninth and Tenth.	520	30	1, 692						1889	
Riggs street, between R and S, to New Hampshire avenue and Nineteenth street.	837	30	2, 555						1897	
S street, from Florida avenue to Seventh street.	1, 300	32	4, 539						1894	
S street, from Seventh to Eleventh.	1, 400	32		5, 047					1889	
S street, from Eleventh to Fourteenth.	1, 300	32	4, 240	995					1875	1891
S street, from Fourteenth to Sixteenth.	1, 160	32	1, 757	2, 457					1894	1894
S street, from Sixteenth to New Hampshire avenue.	735	32	2, 681						1873	Do.
S street, from New Hampshire avenue to Twentieth street.	1, 560	32	5, 195						1889	
S street, from Twentieth to Connecticut avenue.	300	32	1, 077						1889	
Oregon avenue, between S and T, to New Hampshire avenue and Eighteenth street.	1, 150	30	2, 484						1895	
Oregon avenue, from Eighteenth to Nineteenth.	402	30						1, 340		
Pierce street, between S and T, to Fourteenth and Fifteenth.	400	30	2, 154						1873	Do.
Pierce street, between S and T, to Fifteenth and Sixteenth.	400	30	1, 806						1893	
Pierce street, between S and T, to Sixteenth and Seventeenth.	520	40						1, 320		
Watminster street, between S and T, to Ninth and Tenth.	535	30	1, 749						1893	Macadam.
T street, from Florida avenue to Ninth street.	800	32	2, 888						1897	
T street, from Ninth to Tenth.	535	32	1, 766						1891	
T street, from Tenth to Fourteenth.	1, 600	32	4, 256						1883	
T street, from Fourteenth street to New Hampshire avenue.	1, 320	32	5, 147						1895	
T street, from New Hampshire avenue to Florida avenue.	1, 517	32				5, 400				
Willard street, between T and U, to Seventeenth and Eighteenth.	870	25						2, 390		

Permit work.

TABLE H.—Statement of character and extent of street pavements July 1, 1898—Continued.

NORTHWEST—Continued.

Locality.	Carriageway.										Resurfaced; originally paved with—
	Length.	Width.	Asphalt.	Coal tar and con-crete.	Granite.	Cobble and blue rock.	Macadam.	Asphalt block.	Gravel and unim-proved.	Year paved.	Year resurfaced.
Caroline street, between T and U, to Fifteenth and Sixteenth.	Feet. 520	24	Sq. yds. 1,825							1891	
Wallach street, between T and U, to Thirteenth and Fourteenth.	610	30						22,075		1896	
U street, from Ninth to Tenth.	570	32	2,301							1891	
U street, from Tenth to Fourteenth.	1,560	45	4,808							1893	
U street, from Fourteenth to Sixteenth.	1,150	45	3,310							1891	
U street, from Sixteenth to Florida avenue.	1,367	45	4,125							1897	
Beaton street, between U and V, to Seventeenth and Eighteenth.	560	20							1,823		
V street, from Vermont avenue to Thirteenth street.	1,348	32							4,211		
V street, from Thirteenth to Fifteenth.	1,357	32	4,543							1894	
V street, from Fifteenth street to Florida avenue.	1,395	32							4,541		
W street, from Florida avenue to Florida street.	2,470	32	61,368						5,838	1897	
Connecticut avenue, intersection of Florida avenue.			140							1896	
Connecticut avenue, from H street to Florida avenue.	6,000	50	36,246							1878	Coal tar.
Florida avenue, from Q street to R.	415	46	2,612							1895	1878
Florida avenue, from R street to Connecticut avenue.	387	46					1,876			1895	1884
Intersection of Connecticut avenue and S street.			2,064							1896	1886
Florida avenue, from Connecticut avenue to Eighteenth street.	1,500	46	5,080							1896	1897
Florida avenue, from Eighteenth street to Ninth.	7,074						39,315			1875	1876
Florida avenue, from Ninth street to Seventh.	650	45			2,304					1874	1874
Florida avenue, from Seventh street to New Jersey avenue.	1,250	46	7,208							1888	1888
Florida avenue, from New Jersey avenue to Fourth street.	900	46	3,405							1890	1890
Florida avenue, from Fourth street to First.	1,330	46					6,503			1896	1896

Rhode Island avenue, from Thirteenth to Ninth street...	1,200	9,219				1892	
Rhode Island avenue, from Ninth to Fifth street...	1,300	8,120				1893	
Rhode Island avenue, from Fifth street to New Jersey avenue.	1,320	2,313				1893	
Rhode Island avenue, from New Jersey to Florida avenue.	220	1,146				1893	
Virginia avenue, from B to E street.	2,050				11,400		
Virginia avenue, from E to G street.	1,850	8,724				1895	
Virginia avenue, from G to Rock Creek.	2,000				10,153	1896	
Vermont avenue, from H to I street.	2,400	4,156				1872	1880
						1872	1878
Vermont avenue, from K to M street.	1,150	6,340				1872	1872
						1873	1884
Vermont avenue, from M to P street.	1,100	6,150	190			1873	1893
Vermont avenue, from P to R street.	980	6,103				1881	
Vermont avenue, from R to T street.	800			4,853			
Vermont avenue, from T street to Florida avenue.	1,100	50					
					6,424		

Do.

Do.

Do.

SOUTHWEST.

South Capitol street, from B (west side) to Canal.	1,350	50		2,827		3,750	1894
South Capitol street, from Canal (west side) to H.	1,000	50		2,208		1,386	
South Capitol street, from H (west side) to M.	1,300	50			1,623	6,166	
South Capitol street, from M (west side) to N.	600					18,844	
South Capitol street, from N (west side) to river.	2,200					890	
Half street, from Virginia avenue to river.	5,300	32					
Augusta street, between Half to First, R to S.	400	20					
First street, from center Botanic Garden to Maryland avenue.	400	53	2,270				1873 1896
First street, from Maryland avenue to Virginia avenue.	1,800	35		7,000			1873
First street, from Virginia avenue to M street.	2,300	35		8,000			1876
First street, from M to N.	700	32		2,314			
First street, from N to river.	3,700	32				13,160	
Second street, from Maryland avenue to C street.	550	35	2,224				1892
Second street, from C to F.	1,200	32					1892
Second street, from F to L.	1,500	32	5,690		5,886		1889
Second street, from L to river.	3,100	32				11,913	
Third street, from center Botanic Garden to B.	850	40		3,835			1881
Third street, from center Virginia avenue.	1,300	40	5,890				1884
Third street, from Virginia avenue to F street.	1,480	40	2,988				1885
Third street, from F to H.	700	40	2,947				1895
Third street, from H to P.	2,500	40	2,710			9,803	1896
Fourth and a-half street, from center of Mall to Maine avenue.	450	55	2,250				1883
Fourth and a-half street, from Maine avenue to Maryland avenue.	420	55		12,851			1890
Fourth and a-half street, from Maryland avenue to H street.	2,650	55					1882

TABLE H.—*Statement of character and extent of street pavements July 1, 1898—Continued.*

NORTHWEST—Continued.

Locality.	Carriageway.										Resurfaced; originally paved with—
	Length.	Width.	Asphalt.	Coal tar and concrete.	Granite.	Cobble and blue rock.	Macadam.	Asphalt block.	Gravel and unimproved.	Year paved.	Year resurfaced.
New York avenue, from New Jersey avenue to North Capitol street.	Feet. 1,720	50	Sq. yds. 6,604					Sq. yds. 1890		1890	
New York avenue, from New Jersey avenue to Seventh street.	2,150	50	9,229							1889	
New York avenue, from Ninth to Fifteenth street.	3,100		15,644	6,948						1872	1878 } 1885 } 1875 }
New York avenue, from Seventeenth to Eighteenth street.	680	50		3,509						1873	1878 } Coal tar.
New York avenue, from Eighteenth to Nineteenth street.		50									Asphalt.
New York avenue, from Nineteenth to Twenty-third street.	1,980	50							11,388		
Ohio avenue, from Twelfth to Fifteenth street.	1,030	60				11,385				1872	
Pennsylvania avenue, from First to Sixth street.	2,250	108½	25,322							1874 } 1867 } 1876 }	Do.
Pennsylvania avenue, from Sixth to Fifteenth street.	4,120	108½	53,199							1870 } 1877 }	Do.
Pennsylvania avenue, from Fifteenth to Eighteenth street.	2,340	85	17,017							1871	Coal tar.
Pennsylvania avenue, from Eighteenth to Twenty-third street.	2,370	80	15,815							1875 } 1876 }	Coal tar (north and south side).
Pennsylvania avenue, from Eighteenth to Twenty-third street.		80		11,398						1875	
Pennsylvania avenue, from Twenty-third street to Rock Creek.	1,500	80	12,753							1877 } 1888 }	Coal tar.
Pennsylvania avenue, around Washington circle.	1,256		6,088							1880	
Rhode Island avenue, from Connecticut avenue to Scott circle.	1,280	50	4,701	710						1873 } 1893 }	Do.
Rhode Island avenue, from Scott circle to Thirteenth street.	1,090	50	7,722							1881	

[illegible]

SOUTHWEST.

[illegible]

TABLE H.—Statement of character and extent of street pavements July 1, 1898—Continued.

SOUTHWEST—Continued.

Locality.	Carriageway.										Resurfaced; originally paved with—
	Length.	Width.	Asphalt.	Coal tar and com.	Granite.	Cobble and blue rock.	Macadam.	Asphalt block.	Gravel and unimproved.	Year paved.	Year resurfaced.
Four-and-a-half street, from H to P.....	Feet. 3,070	55								1889	
Union street, from Four-and-a-half to Sixth, between M and O.....	1,280	40			14,566	5,333					
Sixth street, from center of Mall to C street.....	1,250	66									
Sixth street, from C to river.....	4,530	40			18,700	5,667				1873	
Six-and-a-half street, from Sixth to Seventh, between D and E.....	500	28						1,477		1888	
Seventh street, from center of Mall to Water street.....	5,200	51			19,839					1877	
Eighth street, from B to C.....	400	35	1,434							1890	
Eighth street, from C to E.....	910	35	3,035							1893	
Eighth street, from E to H.....	1,047	35	3,574							1895	
Eighth street, from H to Water.....	683	35							2,332		
Ninth street, from B to C.....	410	32	1,458							1889	
Ninth street, from C to D.....	250	32				900					
Ninth street, from D to Water.....	2,100	32	7,061							1883	
Tenth street, from B to Maryland avenue.....	780	32						2,411		1886	
Tenth street, from Maryland avenue to river.....	1,500	32			5,500						
Eleventh street, from B to river.....	2,100	40			9,500					1873	
Twelfth street, from B to river.....	1,870	40			8,444					1873	
Twelfth street, from center of Mall to B street.....	1,760	40			3,735					1873	
Thirteenth street, from B to Maryland avenue.....	1,180	40	5,705							1876	
Thirteenth street, from Maryland avenue to Water street.....	1,470	40							2,088	1891	
Thirteen-and-a-half street, from B to D.....	870	32						3,016		1895	
Thirteen-and-a-half street, from D to Maryland avenue.....	880	32				1,275				1875	
Thirteen-and-a-half street, from Maryland avenue to river.....	250	32							900		
Fourteenth street, from center of Mall to B street.....	600	40			3,920						
Fourteenth street, from B to Maryland avenue.....	1,430	40			6,574					1893	
Fifteenth street, from B to river.....	1,080	35							2,625		
B street, from South Capitol to First.....	840	35			4,486					1873	
B street, from First to Maryland avenue.....	1,240	35			5,305					1884	
B street, from Sixth to Fourteenth.....	2,280	33	15,840							1879	

	600	50	1, 623		6, 106	1873	1880	1886	1896
South Capitol street, from M to N.....	2, 200	50			11, 380				
South Capitol street, from N to river.....	3, 400	32							
Half street, from Virginia avenue to river.....	760	45	4, 412						
First street, from East Capitol to B.....	500	38		2, 152					
First street, from B to C.....	400	35							
First street, from C to D.....	400	35							
First street, from D to E.....	576	35							
First street, from E to river.....	3, 000	32	2, 001						
Heckman street, from First to Second, S. of E.....	3, 600	32			10, 341				
Second street, from First to Second, S. of E.....	640	30			2, 100				
Second street, from East Capitol to Pennsylvania avenue.....	700	32	2, 311						1881
Second street, from Pennsylvania avenue to D.....	1, 200	35		4, 906					
Second street, from D to Virginia avenue.....	800	32			2, 883				1882
Second street, from Virginia avenue to I.....	450	32			1, 216				1892
Second street, from I to river.....	1, 500	32							
Third street, from East Capitol to Pennsylvania avenue.....	910	32	3, 521						1884
Third street, from Pennsylvania avenue to C.....	310	32							1887
Third street, from C to D.....	620	32			2, 572		987		1882
Third street, from D to Virginia avenue.....	1, 440	32			5, 030				1876
Third street, from Virginia avenue to K.....	1, 650	32			2, 464				1890
Third street, from K to L.....	270	32							
Third street, from L to Georgia avenue.....	1, 250	32	4, 461		800				1877
Fourth street, from East Capitol to Pennsylvania avenue.....	1, 100	35		3, 764					1883
Fourth street, from Pennsylvania avenue to North Carolina avenue.....	200	35					503		1890
Fourth street, from North Carolina avenue to river.....	4, 030	35							1889
Fifth street, from East Capitol to Pennsylvania avenue.....	1, 140	40	4, 916				6, 633		1882
Fifth street, from intersection of C.....							693		1890
Fifth street, from Pennsylvania avenue to E.....	750	32	2, 570						1894
Fifth street, from E to river.....	3, 000	32					10, 535		1886
Fifth street, from East Capitol to Pennsylvania avenue.....	1, 390	35					5, 949		1887
Sixth street, from Pennsylvania avenue to E.....	730	35					4, 399		1887
Sixth street, from E to Virginia avenue.....	1, 330	35					4, 775		1889
Sixth street, from Virginia avenue to K.....	300	35					926		1887
Sixth street, from East Capitol to Pennsylvania avenue.....	1, 730	32					7, 223		1889
Seventh street, from D to Virginia avenue.....	2, 100	35					8, 394		1889
Seventh street, from Virginia avenue to M.....	600	32			2, 200				1890
Eighth street, from East Capitol to B.....	475	40	2, 408						1895
Eighth street, from B to D.....	1, 045	40	4, 765						1894
Eighth street, from D to K.....	2, 200	55	9, 182						1884
Eighth street, from K to M.....	720	35	2, 929						1883
Ninth street, from East Capitol to I.....	3, 500	32			10, 176		1, 247		1890
Ninth street, from I to Eastern Branch.....	2, 450	32					8, 366		1890
Tenth street, from East Capitol to D.....	1, 800	32			6, 000				1891
Tenth street, from D to Pennsylvania avenue.....	1, 200						788		1891
Tenth street, from Pennsylvania avenue to I.....	1, 240	32					4, 778		1896
Tenth street, from I to Eastern Branch.....	4, 600	32					8, 022		1891
Eleventh street, from East Capitol to C.....	1, 450	48					8, 076		1891

South Capitol street, from M to N.....

South Capitol street, from N to river.....

Half street, from Virginia avenue to river.....

First street, from East Capitol to B.....

First street, from B to C.....

First street, from C to D.....

First street, from D to E.....

First street, from E to river.....

Heckman street, from First to Second, S. of E.....

Second street, from First to Second, S. of E.....

Second street, from East Capitol to Pennsylvania avenue.....

Second street, from Pennsylvania avenue to D.....

Second street, from D to Virginia avenue.....

Second street, from Virginia avenue to I.....

Second street, from I to river.....

Third street, from East Capitol to Pennsylvania avenue.....

Third street, from Pennsylvania avenue to C.....

Third street, from C to D.....

Third street, from D to Virginia avenue.....

Third street, from Virginia avenue to K.....

Third street, from K to L.....

Third street, from L to Georgia avenue.....

Fourth street, from East Capitol to Pennsylvania avenue.....

Fourth street, from Pennsylvania avenue to North Carolina avenue.....

Fourth street, from North Carolina avenue to river.....

Fifth street, from East Capitol to Pennsylvania avenue.....

Fifth street, from intersection of C.....

Fifth street, from Pennsylvania avenue to E.....

Fifth street, from E to river.....

Fifth street, from East Capitol to Pennsylvania avenue.....

Resurfaced on asphalt block.

b Two roadways, 40 feet each.

a Permit work.

TABLE H.—Statement of character and extent of street pavements July 1, 1898—Continued.

SOUTHEAST—Continued.

Locality.	Carriageway.										Resurfaced, originally paved with—
	Length.	Width.	Asphalt.	Coal tar and concrete.	Granite.	Cobble and blue rock.	Macadam.	Asphalt block.	Gravel and unimproved.	Year paved.	Year resurfaced.
Eleventh street, from C to Pennsylvania avenue	Feet.	Feet.	Sq. yds.	Sq. yds.	Sq. yds.	Sq. yds.	Sq. yds.	Sq. yds.	Sq. yds.	1882	.....
Eleventh street, from Pennsylvania avenue to bridge	1,208	48	.....	.....	15,451	.....	.....	7,006	.....	1889	.....
Eleventh street, from M to river (west side)	3,900	40	.....	.....	4,367	.....	.....	.....	.....	1889	.....
Twelfth street, from Lincoln Square to river	1,700	56	.....	.....	.....	.....	.....	.....	.....	1882	.....
Thirteenth street, from Lincoln Square to D	4,400	35	.....	.....	.....	.....	.....	.....	17,956	.....	.....
Thirteenth street, from East Capitol to D	2,050	35	.....	.....	.....	.....	.....	.....	8,000	.....	.....
Thirteenth street, from D to Pennsylvania avenue	800	35	.....	.....	.....	.....	3,592	.....	.....	.....	.....
Thirteenth street, from Pennsylvania avenue to river	2,450	35	.....	.....	.....	.....	.....	.....	9,538	.....	.....
Fourteenth street, from East Capitol to river	4,700	45	.....	.....	.....	.....	.....	.....	23,500	.....	.....
Fifteenth street, from East Capitol to river	4,500	35	.....	.....	.....	.....	.....	.....	17,500	.....	.....
Sixteenth street, from East Capitol to Kentucky avenue	3,300	35	.....	.....	.....	.....	.....	.....	12,833	.....	.....
Seventeenth street, from East Capitol to river	3,300	35	.....	.....	.....	.....	.....	.....	12,833	.....	.....
Eighteenth street, from East Capitol to Congressional Cemetery	2,300	35	.....	.....	.....	.....	.....	.....	8,107	.....	.....
Nineteenth street, from East Capitol to Congressional Cemetery	2,300	35	.....	.....	.....	.....	.....	.....	8,107	.....	.....
Twentieth street, from East Capitol to B	700	35	.....	.....	.....	.....	.....	.....	2,560	.....	.....
Twenty-first street, from East Capitol to B	700	35	.....	.....	.....	.....	.....	.....	2,560	.....	.....
Twenty-second street, from East Capitol to B	700	35	.....	.....	.....	.....	.....	.....	2,560	.....	.....
Twenty-third street, from East Capitol to B	700	35	.....	.....	.....	.....	.....	.....	2,560	.....	.....
East Capitol street, from First (south half) to Fourth	1,500	50	2,736	.....	.....	.....	.....	.....	.....	1879	.....
East Capitol street, from Fourth to Ninth (south half)	1,900	50	3,417	.....	.....	.....	.....	.....	.....	1879	.....
East Capitol street, from Ninth to Eleventh (south half)	1,600	50	1,733	.....	.....	.....	.....	.....	.....	1883	.....
East Capitol street, from Lincoln Square to Eastern Branch (south half)	4,280	50	.....	.....	.....	.....	.....	.....	12,941	.....	.....
A street, from Second to Third	350	42	1,724	.....	.....	.....	.....	.....	.....	1881	.....
A street, from Third to Sixth	950	35	.....	.....	.....	.....	.....	3,317	.....	1880	.....
A street, from Sixth to Seventh	600	35	.....	.....	.....	.....	.....	2,301	.....	1887	.....
A street, from Seventh to Ninth	800	35	.....	.....	.....	.....	.....	3,043	.....	1894	.....
A street, from Massachusetts avenue to Eastern Branch	4,000	35	.....	.....	.....	.....	.....	.....	15,600	.....	.....
A street (south side) to Lincoln Square	850	35	.....	.....	.....	.....	.....	.....	.....	.....	.....
B street, from South Capitol to New Jersey avenue	300	40	.....	.....	370	.....	4,998	.....	.....	1896	.....

Asphalt.
Do.

	1,300	45-55	8,942	605		1873	1891	Coal tax.
B street, from New Jersey avenue to Second street a	1,300	35	8,942			1881		
B street, from Second to Fifth	970	35	3,810			1887		
B street, from Fifth street to North Carolina avenue	870	35		3,154		1881		
B street, from North Carolina avenue to Eleventh street	1,000	35			4,577	1881		
B street, from Eleventh to Nineteenth	4,300	35			16,455	1891		
B street, from Nineteenth street to Eastern Branch	1,400	35				4,622		
Carroll street, between B and C, First and Second	500	24	1,416			1893		
C street, from South Capitol to New Jersey avenue	200	32	948			1889		
C street, from New Jersey avenue to Fourth street	1,900	32			6,922	1884		
C street, from Fourth to Sixth	400	32			1,464	1890		
C street, from Sixth to Seventh	600	32			2,142	1890		
C street, from Seventh to Eighth	500	32			1,614	1891		
C street, from Eighth to Ninth	1,200	32			4,573	1889		
C street, from Ninth to Eleventh	1,200	32			10,223	1893		
C street, from Eleventh to Nineteenth	4,300	32	1,178			1889		
D street, from South Capitol to First	800	35	3,274			1890		
D street, from First to Third	1,000	35			4,384	1889		
D street, from Third to Sixth	1,900	35			8,960	1890		
D street, from Sixth to Seventh	580	34			1,798	1874		
D street, from Seventh street to Pennsylvania avenue	1,000	35			3,269	1892		
D street, from Pennsylvania avenue to Nineteenth street	4,550	35			17,810	1890		
D street, from Second to (south side) Third	370	35	1,454			1890		
Ivy street, from D and E to New Jersey avenue and South Capitol	530	34			2,131	1890		
E street, from South Capitol to Third	1,900	45			7,819	1895		
E street, from Third street to Pennsylvania avenue	2,950	35			12,486	1885		
E street, from Pennsylvania avenue to Thirteenth street	720	35	4,511			1893		
E street, from Thirteenth to Nineteenth	3,200	40	5,739			1893		
G street, from Third to Eleventh	2,950	36		7,637	7,637	1885		
G street, from Eleventh to Pennsylvania avenue	850	36			1,799	1891		
G street, from Pennsylvania avenue to Seventeenth street	1,875	36		2,387	2,737	1893		
I street, from South Capitol to Second	1,000	35			4,000	1892		
I street, from Second to Third	1,400	35			1,220	1891		
I street, from Third to Eighth	1,800	35	8,645		5,563	1896		
K street, from Eighth to Georgia avenue	7,680	35			3,355	1896		
K street, from South Capitol to Eastern Branch	7,680	35			27,223			
L street, from South Capitol to Eastern Branch	7,680	35			27,533			
Van street, between New Jersey avenue and First, M and N	550	25			1,445			
M street, from South Capitol to Fourth	2,400	35			8,944			
M street, from Fourth to Eastern Branch	4,600				6,327			
Quander street, between M and N, New Jersey avenue and First	440	25			1,555			
N street, from South Capitol to Third	2,030	35			4,037			
N street, from Third to Twelfth	1,600	35			6,500			
O street, from South Capitol to Eastern Branch	1,600	35			3,200			
Water street, between B and C, Twelfth and Thirteenth	510	30			1,687			

a Widened, First to Second streets.

TABLE H.—Statement of character and extent of street pavements July 1, 1893—Continued.
SOUTHEAST—Continued.

Locality.	Carriageway.										Resurfaced; originally paved with—
	Length.	Width.	Asphalt.	Coal tar and concrete.	Granite.	Cobble and blue rock.	Macadam.	Asphalt block.	Gravel and improved.	Year paved.	Year resurfaced.
Georgia avenue, from South Capitol to Nineteenth street.....	7,500	50									
Kentucky avenue, from Lincoln Square to Eastern Branch.....	4,350	50									
Massachusetts avenue, from Thirteenth to Nineteenth street.....	3,600	50									
New Jersey avenue, from B to E street.....	1,600	50									
New Jersey avenue, intersection of B street.....	1,600	50			8,776				19,500	1879	
New Jersey avenue, from Canal to M street.....	1,400	50			605					1878	
New Jersey avenue, from M to N street.....	600	50					6,898				
North Carolina avenue, from First to Third street.....	600	50									
North Carolina avenue, from Third to Sixth street.....	600	50									
North Carolina avenue, from Sixth to Eighth street.....	1,240	50						5,033		1890	
North Carolina avenue, from Eighth to Eleventh street.....	1,150	50						6,378		1891	
Pennsylvania avenue, intersection of Second street.....	1,900	(a)	2,428					6,480		1892	
Pennsylvania avenue, from Second to Fourth street.....	1,400	(a)	1,458							1879	
Pennsylvania avenue, from Fourth to Sixth street.....	1,400	(a)	1,715							1876	1882
Pennsylvania avenue, from Sixth to Seventh street.....	1,100	(a)	5,125							1879	
Pennsylvania avenue, from Eighth to Eleventh street.....	1,000	(a)	5,320							1883	
Pennsylvania avenue, from Eleventh to Twelfth street.....	6,800	(a)	5,400							1888	
Pennsylvania avenue, from Twelfth to Thirteenth street.....	1,500	(a)					20,147			1880	
South Carolina avenue, from Second to Sixth street.....	1,600	50									
South Carolina avenue, from Sixth to Ninth street.....	700	20	1,572					3,258	8,500	1891	
South Carolina avenue, from Ninth to Eleventh street.....	3,200	50							17,777	1896	
South Carolina avenue, from Eleventh to Eastern Branch.....	300	50									
Virginia avenue, from Second to Third street.....	3,010	50					2,354			1889	
Virginia avenue, from Third to Eleventh street.....	1,800	50							17,000		
Virginia avenue, from Eleventh street to Eastern Branch.....									9,000		

Coal tar.
Asphalt (south side).
Asphalt (north side).

TABLE H.—Statement of character and extent of street pavements July 1, 1893—Continued.

NORTHEAST—Continued.

Locality.	Carriageway.										Resurfaced; originally paved with—
	Length.	Width.	Asphalt.	Coal tar and concrete.	Granite.	Cobble and blue rock.	Macadam.	Asphalt block.	Gravel and unimproved.	Year paved.	
	Feet.	Feet.	Sq. yds.	Sq. yds.	Sq. yds.	Sq. yds.	Sq. yds.	Sq. yds.	Sq. yds.		
C street, from Tenth to Eastern Branch	5,500	32							19,185		
D street, from North Capitol to Delaware avenue	340	32							1,920		
D street, from Delaware avenue to Massachusetts avenue	1,200	32	4,117							1893	
D street, from Massachusetts avenue to Maryland avenue	1,450	32					5,446			1890	
D street, from Maryland avenue to Fifteenth	3,500	35	1,641						12,000	1897	
E street, from North Capitol to First	800	35			2,913					1893	
E street, from First to Fourth	1,420	30						5,640		1893	
E street, from Fourth to Fifteenth	4,862	35							16,439		
California street, between E and F, First and Second	640	24	61,035							1891	
F street, from North Capitol to Third	2,000	35	8,335						10,800	1891	
F street, from Third to Fifteenth	5,100	35	9,057						2,285	1888	
Chicago street, between F and G, First and Second	576	30							2,000		
Morris street, between F and G, Sixth and Seventh	800	30							6,151	1890	
G street, from North Capitol to First	800	35	2,934							1891	
G street, from First to Sixth	1,800	35							16,000	1897	
G street, from Sixth to Seventh	564	35	552				2,360				
G street, from Seventh to Fifteenth	3,500	35									
J street, between G and H, North Capitol and First	750	20				1,738					
James street, between G and H, Twelfth and Thirteenth	450	30							1,151		Asphalt
H street, from North Capitol to First	950	56	4,190							1893	Asphalt (north side).
H street, from First to Fifteenth	6,320	56	14,124							1893	Asphalt (south side).
Do			13,062							1890	
Wylie street, between H and I, Twelfth and Thirteenth	450	24							1,960	1890	
I street, from North Capitol to First	840	35	3,295						7,531	1890	
I street, from First to Sixth	1,780	35					1,779			1890	
I street, from Sixth to Seventh	564	35							8,058	1890	
I street, from Seventh to Florida avenue	2,567	35									
Myrtle street, between North Capitol and First, I and K	850	30	1,426							1890	

K street, from North Capitol to First.	850	50	4,498					23,436	1899
K street, from First to Florida avenue.	4,300	50						2,220	
Penton street, between North Capitol and First, K and L.	850	24							
Callan street, between K and L, Sixth and Seventh.	561							1,267	
L street, from North Capitol to Florida avenue.	4,500	35						17,500	
Forsyth street, between North Capitol and First, L and M.	850	25						2,220	
Babcock street, between L and M, North Capitol and First.	850	25						2,220	
Riley street, between L and M, North Capitol and First.	850	25						2,220	
M street, from North Capitol to Second.	1,468	32	5,486						1894
M street, from Second to Florida avenue.	1,730	32	7,183						1896
Patterson street, between M and N, North Capitol and Second.	1,480	25						6,045	
Morton place, between Sixth and Seventh streets, M and L.	650	25						1,800	
N street, from North Capitol to Florida avenue.	2,270	35						7,800	
Decatur street, between P and O, North Capitol and First.	747	25						1,245	
Orleans street, between L and M, Sixth and Seventh.	650	30						1,800	
O street, from North Capitol to Florida avenue.	1,250	35						4,022	
P street, from North Capitol to Florida avenue.	700	32	2,539						1896
Delaware avenue, from B to C street.	590	50		2,056					1879
Delaware avenue, from C street to Florida avenue.	5,300	50						27,112	
Florida avenue, from North Capitol to New York avenue.	1,300	46						6,944	
Florida avenue, from New York avenue to Brentwood road.	700					3,040			1895
Florida avenue, from Brentwood road to Ninth street.	3,140	46				15,107			1898
Florida avenue, from Ninth to Fifteenth street.	3,060	46				17,005			1892
Maryland avenue, from First to Fourth street.	1,650	60							1887
Maryland avenue, from Sixth to Eleventh street.	2,170	60						11,535	
Maryland avenue, from Eleventh to Thirteenth street.	1,070	60						14,951	
Maryland avenue, from Thirteenth to Fifteenth street.	1,040	60						8,269	
Maryland avenue, from intersection of Fifteenth street.	280	60		2,527				9,635	
Massachusetts avenue, from North Capitol to First street.	950	50	4,089						1889
Massachusetts avenue, from First to Second street.	720	51						3,961	
Massachusetts avenue, from Second to Fourth street.	900	60	6,001						1893
Massachusetts avenue, from Sixth to Eighth street.	1,060	60						6,749	
Massachusetts avenue, from Eighth to Eleventh street.	980	50						6,398	
New York avenue, from North Capitol street to Florida avenue.	1,270	50	5,383						1891
North Carolina avenue, from Lincoln Square to C street.	2,060	60						11,110	
Tennessee avenue, from Lincoln Square to Fifteenth street.	2,060	50						11,600	

a Permit work.

b Second to Seventh street.

P street, from 340 feet west of bridge	240	40	1,590																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																													
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TABLE H.—*Statement of character and extent of street pavements July 1, 1898—Continued.*

[illegible]

TABLE I.—*Work done under the appropriation for "Current repairs to streets, avenues, and alleys" from July 1, 1897, to June 30, 1898.*

Cement sidewalks.....	square yards..	151.96
Grading.....	cubic yards..	3,665.50
Flag laid.....	linear feet..	2,278.00
Flag relaid.....	do.....	7,766.00
Curb set.....	do.....	282.00
Curb reset.....	do.....	2,533.79
Cobble paved.....	square yards..	2,542.00
Brick sidewalk paved.....	do.....	61.00
Brick sidewalk repaved.....	do.....	10,756.00
Granite block paved.....	do.....	758.33
Granite block repaved.....	do.....	2,027.00
Vitrified brick paved.....	do.....	68.00
Vitrified brick repaved.....	do.....	571.00
Asphalt block paved.....	do.....	218.00
Asphalt block repaved.....	do.....	2,301.00
Asphalt tile sidewalk.....	do.....	447.00
Vitrified block paved.....	do.....	420.00
Vitrified block repaved.....	do.....	141.00
Gravel.....	do.....	24,724.00
Cobble repaved.....	do.....	10,301.00
Labor.....		\$28,029.60
Material.....		\$1,925.78

TABLE K.—Regular permit.

[Jobs marked with an asterisk (*) were executed by contractor for and paid from appropriation for fiscal year 1897 after the beginning of the fiscal year 1898. They aggregate in cost \$1,379.65.]

No.	Location.	For whom done.	Grad- ing.	Vitri- fied block paved.	Curb reest.	Lin.ft.	Curb set.	Con- crete base.	Brick side- walk paved.	Cement side- walk.	Cement copp- ing.	As- phalt and granite block paved.	Cobble re- walk paved.	Brick side- walk re- paved.	Brick on edge.	As- phalt tile laid and re- laid.	Cost.
*2001	1408 to 1420 (inclusive) Hop- kins place NW.	B. H. Warner & Co.	On yds.	Sq. yds.	Lin. ft.					Sq. yds.	Lin. ft.	Sq. yds.	Sq. yds.	Sq. yds.	Sq. yds.	Sq. yds.	\$108.88
*2	Northwest corner New Hamp- shire avenue and E street (lots 17 and 18, square 150).	H. R. Dulaney								82.66							126.81
3	West side Fourteenth street NW, between Sloughton and Chapin streets.	Anulick Palmer								98.99							255.99
4	West side First street NW, between Indiana avenue and D street.	W. M. Galt & Co.										121.00					75.03
*5	Southeast corner Twenty-first and O streets NW.	A. Crawford				61.65	5.15			80.58							116.89
6	12 Fourteenth street SE	Joseph W. Meyers				12.50	13.84			86.06							12.20
7	3350, 3352, and 3354 M street NW.	John S. Larcombe															82.01
8	Southwest corner Florida ave- nue and E street.	William H. De Laoy	12.00							119.72							118.16
9	South side Chapin street NW, from Fourteenth street to first alley thereof.	T. J. Fisher & Co. (Anulick Palmer).	4.00			10.00										152.00	74.18
10	1515 K street NW	Mrs. Ellen N. Warder								85.32							79.73
*11	1521, 1523, and 1525 Fourteenth street NW.	Conrad Becker	2.50			78.00				107.45							150.14
12	Rear of 1529 Rhode Island avenue NW, (square 195).	Ellen M. Ware										85.00					66.45
*13	Around northeast corner Phelps and Le Roy places.	Mrs. Jennies Miller								133.01							170.38
14	Front of 924 and 926 Seventh street NW.	M. Goldenberg				23.00				59.65							62.06
*15	Front of 217 A street SE	Grant Parish				24.70				17.66		2.50					29.83
*16	1509 Rhode Island avenue NW	F. E. Ryke				22.00				29.39							69.71
17	101 V street NW	H. E. Muel	5.72			68.90				88.43							113.73
18	1540 North Capitol street	R. E. McLaugh								51.67							78.50
21	800 Fourteenth street NW	D. W. S. Nairy								9.02							8.92
22	1708 S street NW	William B. Kl'g				30.00				108.36							85.76
23	Southwest corner Seventeenth and W streets NW.	H. F. Woodard															101.26

TABLE K.—Regular permit—Continued.

No.	Location.	For whom done.	Grading.	Vitrified block paved.	Curb reset.	Curb set.	Concrete base.	Brick sidewalk paved.	Cement sidewalk.	Cement coping.	Asphalt and granite block paved.	Cobble res. paved.	Brick sidewalk paved.	Brick on edge.	Asphalt tile laid and relaid.	Cost.
24	926 Louisiana avenue NW	Golden Love & Co.														\$76.47
25	Eleventh street NW, between F and G.	S. H. Edmonston			23.60	13.50			34.65							45.68
26	Front of 1326 Princeton street NW.	Samuel R. Scharf									5.00					12.97
27	South side Twelfth street SE., front of No. 315.	William Wagner	3.00	13.00	8.00								4.00			26.84
28	Front of 1622 to 1628, inclusive, Sixteenth street NW.	F. C. Stevens			85.70				124.40							127.05
29	Front of 1629 Fourteenth street NW.	F. B. Pyle	.97			23.00			34.66							55.70
30	Front of 1302, 1304, and 1306 Lydecker avenue NW.	R. B. Brown							34.38							32.13
31	East side Holmead avenue, from Whitney avenue to middle of lot 6, block 42.	do	30.50						137.34							138.00
32	South side Columbia road, between Florida and California avenues.	Mrs. Dean	9.20	5.49	3.60	19.27					13.47					61.53
33	Northwest corner Fourteenth and F streets NW.	John E. Willard	3.88			91.80										87.20
34	Northeast corner Eleventh and M streets NW.	R. L. Elliott			128.50				330.57							334.17
35	Front of 1800 Wyoming avenue NW.	W. A. Kimmel							85.56							79.96
36	Front of lots 91, 92, and 93, square 155, west side Seventeenth street, between Q and R.	Hornblower & Marshall			77.00				63.95							71.10
37	Front of 119 Second street NE.	George W. Boyd							16.76							15.97
38	Corner Fifteenth and Nat streets NW.	W. A. Saunders							147.73							139.15
39	Front of 924 Louisiana avenue NW.	Chapin & Sacks			18.80				81.02							79.18
40	Front of lots 15, 16, and 17, square 71, Twenty-second street, between L and M.	James T. Gibbs			64.60				62.00							69.34
41	Front of 907 Sixth street SW.	M. Ullman		10.67			1.50									23.06
42	Front of 1309 P street NW	R. Ross Perry			22.90				22.56							23.63
43	Front of 414 and 416 Massachusetts avenue NW.	C. W. Handy			34.30				44.45							45.86

83	Northwest corner Fourteenth and Binney streets NW.	Albert Carry	8.79	.....	.....	90.80	.....	198.32	.....	.....	.....	264.90
84	Front of 3123 P street NW.	Edw. Schneider	1.50	18.50	6.00	.....	1.00	.....	.....	.....	.....	24.86
85	Front of 1015 M street NW.	Maria L. Bearman .....	.....	.....	26.56	.....	.....	57.28	.....	.....	.....	56.87
86	Front of 2901 Thirteenth street NW.	Solomon Lausburgh	1.66	.....	.....	20.00	.....	.....	.....	.....	.....	16.87
87	Southwest corner Sixth and B streets NE.	S. C. Schaffer	8.36	.....	44.00	40.50	.....	154.42	.....	.....	.....	168.32
88	Front of 614 Thirteenth street NW. (parking).	Matthew Trimble .....	.....	.....	.....	.....	.....	43.80	.....	.....	.....	46.00
89	Front of 1114 G street NW.	James W. Orme .....	.....	.....	.....	.....	.....	36.31	.....	.....	.....	33.94
90	Corner Fourteenth and F streets NW. (Fourth street side).	The Cranford Pav- ing Co. ....	.....	.....	.....	.....	.....	147.23	.....	.....	.....	137.53
91	Front of 928 Louisiana ave- nue NW.	Golden Love & Co. ....	.....	20.20	.....	.....	.....	86.00	.....	.....	.....	83.45
92	Front of 1311 P street NW.	S. B. Holabird .....	.....	32.00	.....	.....	.....	22.56	.....	.....	.....	26.20
93	Corner Thirty-second and P streets NW.	Edw. Conover	1.87	.....	22.50	.....	.....	28.16	.....	.....	.....	32.83
94	Northeast corner Eighteenth and N streets NW.	The Cranford Pav- ing Co.	8.36	.....	80.00	.....	.....	131.94	.....	.....	.....	191.22
95	616, 618, and 620 Thirteenth street NW. (in parking).	C. C. Willard .....	.....	.....	.....	.....	.....	170.97	.....	.....	.....	161.83
96	Front of 1718, 1720, and 1722 Twenty-first street NW.	E. W. Walker & Sons .....	.....	.....	.....	.....	.....	63.33	.....	.....	.....	66.18
97	Front of 3436 Thirteenth street NW.	J. W. Herron .....	.....	.....	.....	.....	.....	32.82	.....	.....	.....	30.67
98	201 A street SE. (Second street side).	Flora B. Cabell .....	.....	.....	.....	.....	.....	85.55	.....	.....	.....	81.82
99	Front of 2017 Q street NW.	Robertean Buchan- an .....	.....	.....	.....	.....	.....	18.24	.....	.....	.....	17.04
2100	South side Wyoming avenue, west of Connecticut ave- nue.	John B. Wimer .....	.....	16.00	.....	.....	.....	95.39	.....	.....	.....	93.83
1	East side New Hampshire av- enue, between N and Twen- tieth streets NW.	G. F. Whiting	1.06	.....	20.40	25.08	.....	268.97	.....	.....	.....	310.43
2	Front of 1205 Nineteenth street NW.	John I. Stoddard .....	.....	25.00	.....	.....	.....	29.38	.....	.....	.....	30.61
3	Alley, square 913, between F and G, Eighth and Ninth NE.	M. I. Weller	1,438.00	.....	6.00	1,090.00	.....	868.26	1,445.00	6.00	.....	4,620.14
4	1237 Harvard street, 2902-2905 Thirteenth street NW.	L. E. Brenninger	7.01	.....	84.40	.....	.....	.....	.....	.....	.....	70.36
5	3127 N street NW.	M. V. Moran .....	.....	.....	.....	.....	.....	22.05	.....	.....	.....	26.21
6	East side Twenty-first street NW., from F street to alley north.	John L. Weaver .....	.....	126.20	14.00	.....	.....	187.17	.....	.....	.....	150.45
9	Front of lot 20, square 653, on One-half street "SW", be- tween N and O.	James Martin	83.00	.....	.....	.....	.....	.....	132.00	.....	.....	87.50
10	Front of 1323 Twelfth street NW.	T. A. Harding .....	.....	.....	.....	.....	.....	21.78	.....	.....	.....	20.35

TABLE K.—*Regular permit—Continued.*

No.	Location.	For whom done.	Grad- ing. <i>Cu. yds.</i>	Vitri- fied block paved. <i>Sq. yds.</i>	Curb reset. <i>Lin. ft.</i>	Curb set. <i>Lin. ft.</i>	Con- crete base. <i>Cu. yds.</i>	Brick side- walk paved. <i>Sq. yds.</i>	Cement side- walk. <i>Sq. yds.</i>	Cement cop- ping. <i>Lin. ft.</i>	As- phalt and granite block paved. <i>Sq. yds.</i>	Cobble re- paved. <i>Sq. yds.</i>	Brick side- walk re- paved. <i>Sq. yds.</i>	Brick on edge, and relaid. <i>Sq. yds.</i>	Cost.
11	Southwest corner Fourteenth and Binney streets NW., Fourteenth-street side.	T. A. Harding .....	.....	.....	.....	.....	.....	.....	77.18	Lin. ft.	Sq. yds.	Sq. yds.	Sq. yds.	Sq. yds.	\$72.12
12	On Fifteenth-street NW., front Portner Flats.	C. A. Didden .....	.....	.....	.....	.....	.....	.....	5.14	.....	.....	.....	.....	.....	4.82
14	Front of 1502 Fourteenth street NW.	S. E. Lewis	1.42	.....	33.80	.....	.....	.....	54.36	.....	.....	.....	.....	.....	83.44
15	Front of 3429 Holmead avenue NW.	Charles C. Adams ..	7.00	.....	.....	.....	.....	.....	33.50	.....	.....	.....	.....	.....	35.56
16	Front of lot 6, block 43, Holmead avenue NW.	Henry Evans	7.00	.....	.....	.....	.....	.....	33.50	.....	.....	.....	.....	.....	35.57
17	Front of 2127 California avenue NW.	Attorney-General McKenna.	.....	.....	.....	.....	.....	.....	6.68	.....	.....	.....	.....	.....	6.25
19	Front of 937 I street NW.	N. B. Larnier .....	.....	.....	.....	.....	.....	.....	7.78	.....	.....	.....	.....	.....	13.09
20	Front of Savoy Department house, 2804 Fourteenth street NW.	O. W. White .....	.....	.....	.....	.....	.....	.....	119.22	.....	.....	.....	.....	.....	111.43
21	South Bates street NW, between North Capitol and First.	G. M. Sternberg	36.62	.....	139.90	.....	.....	.....	138.09	.....	.....	.....	.....	.....	254.91
22	Front of 915, 917, and 919 Seventh street NW.	Rose M. Taylor .....	.....	.....	63.50	.....	.....	.....	99.16	.....	.....	.....	.....	.....	167.99
23	Front of 1207 Nineteenth street NW.	B. H. Johnston .....	.....	.....	19.80	.....	.....	.....	23.83	.....	.....	.....	.....	.....	24.77
24	Front of lot 63, square 962 (D street NE., between Tenth and Eleventh).	A. M. Johnson	1.38	.....	16.60	.....	.....	.....	17.61	.....	.....	.....	.....	.....	20.10
25	Front of lot 89, square 962 (D street NE., between Tenth and Eleventh).	William Z. Ball	1.38	.....	16.60	.....	.....	.....	15.82	.....	.....	.....	.....	.....	18.43
26	Southwest corner Twenty-first street and Massachusetts avenue.	B. H. Warner	10.00	.....	179.00	.....	.....	.....	218.64	.....	.....	.....	.....	.....	238.09
27	Front of 1631 Nineteenth street NW.	T. A. Harding .....	.....	.....	30.00	.....	.....	.....	22.72	.....	.....	.....	.....	.....	23.75
30	Corner Wyoming street, Woodley lane and Columbia road.	George Truesdell ...	15.46	.....	28.00	363.10	.....	.....	594.11	.....	.....	.....	.....	.....	839.23

31	Front of 1207 and 1209 H street NE.	C. G. Emsack							63.16							\$90.71
32	Front of 625 F street NW	Munn & Co.							62.59							53.49
33	Front of 2033 Florida avenue NW.	H. C. Hanbrough							3.06							2.86
34	Front of lot 55, square 8 (Columbia road, east of Eighteenth street).	Waddy B. Wood	2.06					43.80								84.40
35	Front of lot 54, square 8 (Columbia road, east of Eighteenth street).	do	.92					22.22								36.46
36	Front of lot 57, square 8 (Columbia road, east of Eighteenth street).	do	.84					19.99								32.82
37	Front of lot 58, square 8 (Columbia road, east of Eighteenth street).	do	.92					21.69								36.46
38	Northeast corner Fourteenth street and New York avenue NW.	W. G. Peter	12.47					297.11								754.88
39	Front of 1213 Corcoran street NW.	H. J. Horn														17.37
40	Front of 1338 and 1336 Twenty-second street NW.	Carl Eisenmenger														44.17
41	South side I street SW, between Third and Four-and-a-half streets.	J. S. Thompson	18.00	12.00			2.50									37.99
42	Front of 646 and 648 H street NE.	Rosenberg Co.														9.96
43	Fifth street NW, between New York avenue and K street.	Frank Libbey & Co.	26.50				4.00								5.00	53.93
44	On Kansas avenue, between Savannah street and Trenton street; on Trenton street, between Kansas avenue and Eighth street, and on Eighth street, between Trenton street and Savannah avenue.	C. J. Ubhoff	37.00	5.00	973.80											842.06
45	South side Massachusetts avenue NE, between Third and Fourth.	John L. Newrath	4.50	14.00		.68										23.50
46	Alley, west half square 204, between W and V, Fifteenth and Portner place.	William H. Saunders & Co.	171.00	515.00	56.00	18.84										842.50
47	Front of lot 67, square 186, between Rhode Island avenue and O, Fifteenth and Sixteenth streets NW.	George F. Huff	2.00										25.50	3.00		46.54
48	Front of 1723 P street NW	Capt. Herbert J. Slocum, U. S. A.											3.40			2.18

69	Front of 602 Tenth street SW.	George De Atley							14.82				13.85
70	East side Kansas avenue, between Savannah and Trenton streets.	C. J. Ubhoff							620.78				580.11
71	Front of 22 block 40, west side Fourteenth street NW, between Binney and Bacon.	J. W. White							63.31				59.17
72	Lot 9, square 506, Delaware avenue, between M and N streets.	Joseph Manning						84.94	90.91				86.58
73	Front of 1300 Lydecker avenue NW.	Mary E. Skroup							23.41				20.95
74	Front of 1705 and 1707 N street NW.	C. C. Cole							55.36				51.64
75	Front of 501, 503, 505, and 507 L street SE.	William L. Mahoney							134.00				79.38
76	Front of 2929 Fourteenth street NW.	W. A. Miskell									11.50		8.96
77	Front of 509 and 511 H street NE.	Gustave Hartig							88.97				86.41
78	North side E street NW, between Twenty-third and Twenty-fourth streets.	William F. Kelly						63.00					54.50
79	Front of 62, 84, 86, and 90 M street NW.	John R. Gibson			7.80				70.01				73.83
80	Front of 1626 M street NW.	J. Maury Dove							40.91				39.49
81	Southeast corner University and Huntington places.	B. T. Sowers			9.87			234.86	254.03				446.52
82	Southeast corner Third and A streets SE.	W. H. Marlow						30.00	83.09				86.53
83	Front of 104 I street NW.	Hugo Worth						39.25	40.29				52.08
84	North side of East Capitol street, from Fourteenth to Fifteenth streets.	Metropolitan Railroad Co.			{ 171.00 163.00 }			578.00	410.53				977.92
85	Eighteenth and Trenton streets.	J. D. Richardson						42.50	352.89				335.13
86	Front of block 23 Petworth street NW.	Allen W. Mallory & Co.			15.00				62.00				41.35
87	South half of lot 13, Holmead avenue.	Charles G. Porter							16.05				15.56
88	Front of south third lot 8, Holmead avenue.	Daniel Webster							11.20				10.47
89	Front of third of lot 4, east side of Holmead avenue.	B. L. Brackett							11.12				10.40
90	Front of third of lot 4, east side of Holmead avenue.	F. C. Skinner							11.12				10.80
91	Front of lot 4, east side of Holmead avenue.	Henry Klinge							11.12				10.83
92	Front half of lot 2, east side of Holmead avenue.	B. F. Myers							16.02				15.53

TABLE L.—Assessment work—Continued.

No.	Location of work.	Grading.	Vitrified block paved.	Asphalt block paved.	Asphalt block- re- paved.	Cement side- walk. paved.	Brick side- walk paved.	Brick side- walk paved.	Cobble.	Curb set.	Curb reset.	Granite block repaired.	Cement coping.	Cost.
		<i>Cu. yds.</i>	<i>Sq. yds.</i>	<i>Sq. yds.</i>	<i>Sq. yds.</i>	<i>Sq. yds.</i>	<i>Sq. yds.</i>	<i>Sq. yds.</i>	<i>Sq. yds.</i>	<i>Lin. ft.</i>	<i>Lin. ft.</i>	<i>Sq. yds.</i>	<i>Lin. ft.</i>	
*42	Oregon avenue NW., between Eighteenth and Nineteenth streets (both sides).....					554.71								\$1,206.04
*43	O street NW., between Twenty-seventh and Twenty-eighth (both sides).....					625.31				627.72	54.90			1,417.74
*44	D street NE., between Ninth and Tenth (north side).....							184.00		{ 9.42 278.00	{ 9.42 18.00			429.82
*45	Alleys in square 1020, between Twelfth and Thirteenth and G and I streets SE.....	1,731.00	3,133.00							90.84				4,896.71
*46	Thirteenth street NW., between New Hampshire avenue and E street (west side).....													201.69
47	Alleys, square 497, between D and E and Sixth and Seventh streets NW.....					156.59								4,622.09
48	Fourth street NW., between Kenyon street and Whitney NW., (east side).....		2,414.18											
50	Florida avenue NW., between Fourteenth and Fifteenth streets (both sides).....	78.00					137.00							108.70
51	Willard street NW., between Seventeenth and Eighteenth streets (both sides).....	{ 11.19				770.65				134.79	{ 3.00 653.00			923.92
52	Alley, square 1244, between O and P and Twenty-second and Twenty-third streets NW.....									1,695.00				1,385.67
53	Alleys, square 1012, between Tennessee and North Carolina avenues, Lincoln Park, and Thirteenth street NE.....		135.00							45.00	26.00			197.36
54	Alleys, square 280, between N and O and Twelfth and Thirteenth streets NW.....	224.00	483.00					18.00		70.00				710.04
55	Alley, square 248, between Thirteenth and Fourteenth and K and L streets NW.....	85.00	85.00											199.07
56	Alleys, square 14, between Pennsylvania avenue and M, Twenty-fifth, and Twenty-sixth streets NW.....	30.00	80.00											135.03
57	Alleys, square 133, between Eighteenth and Nineteenth and R and S streets NW.....	2,110.00	1,321.00											2,719.64
58	Alley, square 177, between S and T and Sixteenth and Seventeenth streets NW.....	225.00	1,394.00											3,130.56
59	Alleys in east half of square 212, between Fourteenth and Fifteenth and Massachusetts avenue and N street NW.....	149.00		379.00						19.00				779.04
60	Alleys, square 220, between H and I and Fourteenth and Fifteenth streets NW.....	79.00	150.00											247.10
		376.00	1,024.00							18.84	104.00			1,572.93

TABLE L.—Assessment work—Continued.

No.	Location of work.	Grading. <i>Cu. yds.</i>	Vitrified block paved. <i>Sq. yds.</i>	Asphalt block paved. <i>Sq. yds.</i>	Asphalt block re- paved. <i>Sq. yds.</i>	Cement side- walk. paved. <i>Sq. yds.</i>	Brick side- walk paved. <i>Sq. yds.</i>	Brick side- walk re- paved. <i>Sq. yds.</i>	Cobble. <i>Sq. yds.</i>	Curb set. <i>Lin. ft.</i>	Curb reset. <i>Lin. ft.</i>	Granite block repaired. <i>Sq. yds.</i>	Cement coping. <i>Lin. ft.</i>	Cost.
139	Massachusetts avenue NW, between Eighteenth and Nineteenth streets (south side)					166.54								\$167.64
140	Rhode Island avenue NW, between Sixteenth and Seventeenth streets (both sides)													
141	Virginia avenue SW, between Third and Fourth and a-half streets (north side)	73.00				535.84				218.45	451.05			731.00
142	First street SW, between B and C (west side)	4.90				509.14				58.57	436.58			605.17
143	Fifteenth street NW, between K and L (both sides)													
144	Juniper street NW, between Maple and Spence streets (west side)	23.68				254.60				273.30	17.80			473.30
145	Florida avenue, between Twenty-first and R streets NW (east side)													
146	Pennsylvania avenue NW, between Nineteenth and Twentieth streets (north side)									443.63				404.16
147	Florida avenue NW, between Eleventh and Twelfth streets (south side)	19.59				307.92				236.00	34.55			539.20
148	Pennsylvania avenue SE, between Third and Fourth streets (north side)	15.70				686.61				373.95	6.60			1,071.43
149	Twenty-third street NW, between M and N (east side)	114.33				851.44				903.02	11.60			1,452.72
150	Eight street SE, between I and L (west side)	22.86				750.22				544.27	10.00			1,352.40
152	O street NW, between Third street and New Jersey avenue (south side)													
153	H street NW, between Thirteenth and Fourteenth (north side)	27.00				185.31					158.70			212.66
154	Seventeenth street NW, between Pennsylvania avenue and H street (both sides)													
155	R street NW, between Florida avenue and Twenty-first street (north side)					232.47								225.40
156	Thirteenth street NE, between T street and Maryland avenue (west side)	2.40				278.75				28.90				236.94
157	Corcoran street NW, between Thirteenth and Fourteenth, and on south side from Fourteenth street east to alley (north side)													
158	E street NE, between Sixth and Seventh (north side)	71.58				701.96				19.09	620.00			796.20
159	Four-and-a-half street SW, between F and G (east side)	2.16				902.97				26.00	320.30			908.44
160	Ninth street NW, Nos. 212 and 216 (in front of)					69.30					25.60			69.07

TABLE L.—*Assessment work*—Continued.

No.	Location of work.	Grading.		Vitrified block paved.		Asphalt block re-paved.		Cement sidewalk.		Brick sidewalk paved.		Brick sidewalk re-paved.		Cobble.		Curb set.		Curb reset.		Granite block repaved.		Cement coping.		Cost.	
		<i>Cu. yds.</i>	<i>Sq. yds.</i>	<i>Sq. yds.</i>	<i>Sq. yds.</i>	<i>Sq. yds.</i>	<i>Sq. yds.</i>	<i>Sq. yds.</i>	<i>Sq. yds.</i>	<i>Sq. yds.</i>	<i>Sq. yds.</i>	<i>Sq. yds.</i>	<i>Sq. yds.</i>	<i>Sq. yds.</i>	<i>Sq. yds.</i>	<i>Lin. ft.</i>	<i>Lin. ft.</i>	<i>Lin. ft.</i>	<i>Lin. ft.</i>	<i>Sq. yds.</i>	<i>Lin. ft.</i>	<i>Lin. ft.</i>	<i>Lin. ft.</i>		
184	New York avenue NW., between Seventeenth and Eighteenth streets (south side)																								
185	Virginia avenue NW., between Twenty-second and Twenty-third streets (both sides)	22.00						1,193.66										30.00						\$1,151.43	
186	Thirteenth street NW., between K and L (east side)																								
187	Alley (south half), square 89, between N and O and Twenty-first and Twenty-second streets NW.	147.00	625.00																						
188	Second street NW., from G street to Massachusetts avenue (east side)	.84																						980.77	
189	Alley, square 431, between D and E and Seventh and Eighth streets NW.							299.70								19.70		277.10						347.71	
190	Rhode Island avenue NW., between Fourteenth and Fifteenth streets (south side)	153.00	330.00	21.00								11.00												692.88	
191	Third street NW., between the alley north of Pennsylvania avenue and C street (west side)	.75						668.81								9.48		495.10						751.84	
192	Twelfth street, between Florida avenue and Mount Olivet Road, and on east side Twelfth street, between M and P (west side)																								
193	Alley (north half), square 578, between G and I and Sixth and Seventh streets SE.	3,485.00		1,700.00																				8,577.91	
194	Alley, square 538, between B and C and Fifth and Sixth streets NE.	221.00		598.00				404.07								23.55		889.02						1,297.78	
195	Sixth street NE., between H and I (east side)	1.58														18.98								442.76	
196	Alley, square 302, between W street and Florida avenue and Eleventh and Twelfth streets NW.	240.00	720.00													66.00								1,133.90	
197	Alley, square 1012, between Kentucky and Massachusetts avenues and Thirteenth street NE.																								
198	Flint street, from Brightwood avenue eastward to limits of Brightwood Park (both sides)	104.90						1,311.20								105.00								1,732.74	
199	Second street SE., from East Capitol street to Pennsylvania avenue (east side)																							1,227.58	
200	Fifth street NE., between H and I (east side)	10.00						543.44								692.00								549.48	
201	Alley, square east 1014, between D and E streets and Kentucky avenue and Fourteenth street SE.	30.46						284.65								306.87		57.92							

[illegible]

TABLE M.—*Replacing sidewalks and curb around public reservations.*

No.	Location of work.	Cement side- walk. <i>Sq. yds.</i>	Curb set. <i>Lin. ft.</i>	Curb re- set. <i>Lin. ft.</i>	Flag re- laid. <i>Sq. yds.</i>	Cement coping. <i>Lin. ft.</i>	Brick sidewalk laid. <i>Sq. yds.</i>	Grading. <i>Cu. yds.</i>	Cost.
7019	McPherson square (I street side).....	203.60							\$271.08
20	Reservation bounded by Twenty-first street, New Hampshire avenue, and M street (three sides).....	461.30	529.87					50	941.77
21	Ninth street, between F and G N.W. (east side).....	859.02							764.53
22	Seventeenth street, from New York avenue to driveway leading into White Lot N.W. (east side).....	464.48							426.12
23	Reservation bounded by T and Seventeenth streets and New Hampshire avenue N.W. (T street side).....	173.64	61.79	58					277.73
37	New York avenue, between Tenth and Eleventh streets N.W. (south side).....	420.95							374.64
40	Pennsylvania avenue, between Fourth and Sixth streets S.E. (south side).....	537.77	167.98	327				1.50	647.52
8076	Reservation bounded by Pennsylvania avenue, Louisiana avenue, Ninth street, and Little Ninth street N.W.	544.24	2.70	511.45					560.61
	Connecticut avenue, between M and Eighteenth streets (west side).....	236.05	156.20					7	374.05
80	Material purchased.....								862.95
	Total.....	3,991.05	918.54	896.45				58.50	5,000.00

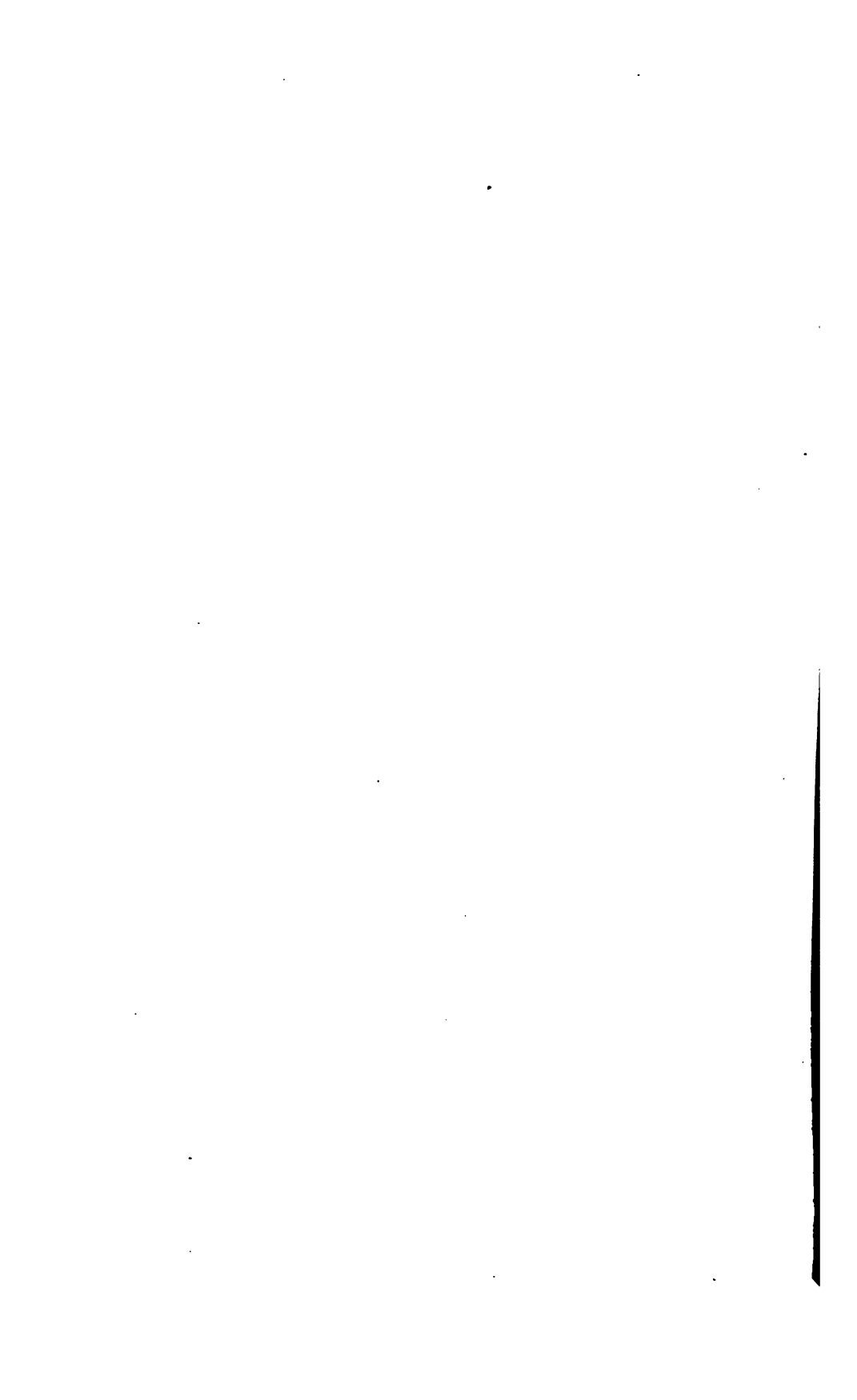


TABLE M.—*Replacing sidewalks and curb around public reservations.*

No.	Location of work.	Cement side- walk.	Curb set.	Curb re- set.	Flag re- laid.	Cement cooping.	Brick sidewalk laid.	Grading.	Cost.
		Sq. yds.	Lin. ft.	Lin. ft.	Sq. yds.	Lin. ft.	Sq. yds.	Cu. yds.	
7019	McPherson square (I street side).....	203.60							\$271.08
20	Reservation bounded by Twenty-first street, New Hampshire avenue, and M street (three sides).....	461.30							941.77
21	Ninth street, between F and G NW. (east side).....	839.02	529.87					50	764.53
23	Seventeenth street, from New York avenue to driveway leading into White Lot NW. (east side).....	464.48							425.12
26	Reservation bounded by T and Seventeenth streets and New Hampshire avenue NW. (T street side).....	173.64	61.79	58					277.73
37	New York avenue, between Tenth and Eleventh streets NW. (south side).....	420.95							374.64
40	Pennsylvania avenue, between Fourth and Sixth streets SE. (south side).....	537.77	167.98	327				1.50	647.52
8076	Reservation bounded by Pennsylvania avenue, Louisiana avenue, Ninth street, and Little Ninth street NW.....	544.24	2.70	511.45					560.61
80	Connecticut avenue, between M and Eighteenth streets (west side).....	238.05	156.20					7	374.05
	Material purchased.....								362.95
	Total.....	3,991.05	918.54	896.45				58.50	5,000.00

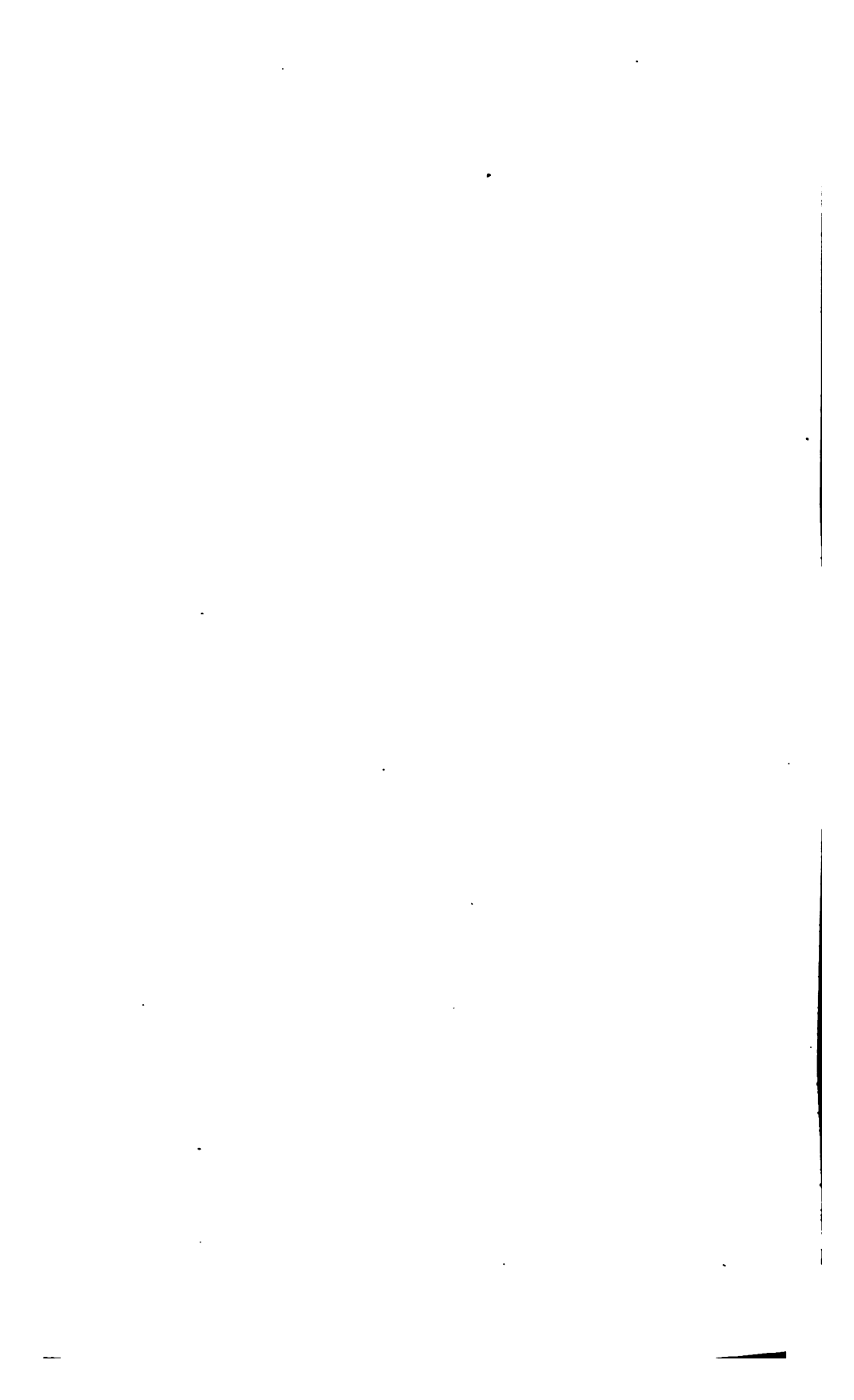


TABLE N.—Misc

Number.	Location.	Appropriation.	Asphalt tile, repaved, square yards.	Grading, cubic yards.
7001	F street, between Third and Fourth NE. (both sides).	Improvements and repairs, north- east section.	.....	.....
5	Thirty-seventh street, between Back and Tennallytown road.	"Thirty-seventh street" .....	.....	.....
9	Sherman avenue.....	Constructing county roads .....	.....	.....
22	E street, between Thirteenth and Fif- teenth SE. (both sides).	Improvements and repairs, south- east section.	.....	1,416.00
24	Thomas circle and Fourteenth street (northwest and southeast corners).	Repairs to concrete .....	.....	.....
25	Pennsylvania avenue and D. Seventh, and Eighth streets SE.	Repairs to school buildings and grounds, 1897.	.....	60.00
28	Columbia road, between Eighteenth street and Florida avenue.	Columbia road, Eighteenth street to Florida avenue.	.....	214.00
29	F street, between Fourth and Ninth NE. (both sides).	Improvements and repairs, north- east section.	.....	.....
30	D street, between Sixth and Seventh SE. (both sides).	D street, between Sixth and Seventh SE.	.....	.....
31	Morris street, between Sixth and Seventh NE. (both sides).	Paving Morris street NE., between Sixth and Seventh.	.....	196.00
32	Eighth and M streets SE.....	Repairs to concrete pavements .....	.....	.....
33	I street, between Ninth and Tenth NW. (north side).	.....do .....	.....	.....
34	Virginia avenue, between South Capitol street and Delaware avenue SW.	Improvements and repairs, south- west section.	.....	286.00
35	Thirty-fifth street, at entrance to Mad- ison street NW. (east side).	Repairs to concrete pavements .....	.....	3.00
36	Virginia avenue, between South Capitol street and Delaware avenue SW.	Improvements and repairs, south- west section.	.....	286.00
38	Le Droit Park, between Spruce and Elm, Larch and Bohrer streets, block 15.	Spruce and Bohrer streets .....	.....	42.00
39	Joliet street, from Connecticut avenue extended to Zoological Park.	Joliet street, from Connecticut ave- nue extended to Zoological Park.	.....	.....
42	Judiciary Square (eastern side)	Repairs to concrete pavements .....	.....	.....
43	Tenth street, between East Capitol and C NE. (both sides).	Improvements and repairs, north- east section.	.....	108.00
44	N street, between Four-and-a-half and Sixth SW. (both sides).	Improvements and repairs, south- west section.	.....	8.00
45	Clifton street, east of Thirteenth NW ...	Clifton, etc., streets, 1898 .....	.....	363.00
46	F street, between Ninth and Fourteenth NW.	Repairs to concrete pavements	220	.....
53	Park road and Zoological Park.....	Kenesaw avenue and Park road .....	.....	.....
54	Twelfth street, between Emporia and Frankfort streets, South Brookland.	Emporia street .....	.....	.....
55	Second street and Pennsylvania avenue SE. and alley, square 760.	Repairs to concrete pavements .....	.....	.....
56	K street, between Sixteenth and Seven- teenth NW.	.....do .....	.....	.....
57	Ninth and H streets NE. (southeast cor- ner).	.....do .....	.....	.....
60	Pennsylvania avenue, between Eight- eenth and Twenty-first streets NW. (north side).	.....do .....	.....	.....
61	Twenty-fifth street and Pennsylvania avenue NW.	.....do .....	.....	.....
74	Emporia street, between Twelfth and Thirteenth.	Emporia street .....	.....	11.00
75	Fourteenth street and Pennsylvania ave- nue NW., and Ninth street and Penn- sylvania avenue NW.	Repairs to concrete pavements .....	.....	.....
96	Canal road, between Thirty-sixth street and Foxhall road.	Emergency fund.....	.....	79.00
70	Western Market, Twenty-first and K streets NW.	Special repairs to market houses ..	.....	.....
72	Six-and-a-half street, between D and E (both sides).	Improvements and repairs, south- west section.	.....	.....
73	Engine house in Anacostia.....	Anacostia engine house .....	.....	.....
77	Irving street, between Seventh street and Sherman avenue.	"Sherman avenue" .....	.....	63.00
78	Morris road.....	Suburban sewers .....	.....	.....
79	Sherman avenue, from Grant street to Irving street.	"Sherman avenue" .....	.....	1,510.00

collaneous work.

Brick sidewalk, paved, square yards.	Brick sidewalk, repaved, square yards.	Cement sidewalk, square yards.	Curb set, linear feet.	Curb reset, linear feet.	Flag laid, linear feet.	Flag relaid, linear feet.	Cobble, square yards.	Asphalt block, paved, square yards.	Victrified block, paved, square yards.	Concrete, cubic yards.	Victrified brick, repaved, square yards.	Macadam replaced, square yards.	Brick on edge, repaved, square yards.	Granite block, repaved, square yards.	Gravel, square yards.	Cost.
	905															\$184.82
																822.36
3,189																12.37
																886.02
			105.00													126.46
		757.29														944.89
	760															146.74
4,930																892.52
1,640							27				7					243.42
1,496																297.55
496			74.40	135			140									1,261.49
						168	74									37.96
				86		60	23									263.78
																42.40
	822													44		392.96
																59.05
																835.47
																126.28
3,428																881.43
1,898																426.55
177									93							320.22
							444									96.74
																679.82
			45.00			60	100									599.34
																106.18
																2.80
																11.17
1,703				847												853.17
									33.33							69.26
		277.33														124.28
				73		36										118.69
							18									403.67
	20							98								173.44
992																279.94
57			120.00		65		20	142								331.26
																15.25
							283									160.35
											1,075					1,527.22

TABLE N.—*Miscella*

Number.	Location.	Appropriation.	Asphalt tile, repaired, square yards.	Grading, cubic yards.
81	Eighth street, between D and E NW. (front of engine house).	Buildings, fire department (be- tween Seventh and Twelfth and C and F streets NW.).	.....	25.00
2	Fourth street, between K and L NE. (both sides).	Improvements and repairs, north- east section, 1898.	.....	138.00
85	Eighteenth street and Columbia road (southeast corner).	Connecticut avenue and Columbia road, 1898.	.....	.....
86	Fourth street, between K and L NE. (both sides).	Improvements and repairs, north- east section.	.....	67.00
87	Municipal disinfecting station, southeast.	Act to prevent spread of scarlet fever, etc., 1898.	.....	.....
88	Grant avenue, between Seventh street and Sherman avenue.	"Sherman avenue" .....	.....	.....
89	Park road, from Sixteenth street to Klingie Ford road.	Kenesaw avenue and Park road ....	.....	.....
90	Smallpox hospital.....	Emergency fund.....	.....	388.00
91	M street, between Thirty-second and Thirty-third (south side).	Improvements and repairs, George- town.	15 .....	.....
92	Southeast corner Eighteenth street and Columbia road.	Connecticut avenue extended and Columbia road.	.....	.90
Total.....		.....	235	5,261.90

new work—Continued.

Brick sidewalk, paved, square yards.	Brick sidewalk, repaved, square yards.	Cement sidewalk, square yards.	Curb set, linear feet.	Curb reset, linear feet.	Flag laid, linear feet.	Flag relaid, linear feet.	Cobble, square yards.	Asphalt block, paved, square yards.	Vitrified block, paved, square yards.	Concrete, cubic yards.	Vitrified brick, repaved, square yards.	Macadam replaced, square yards.	Brick on edge, repaved, square yards.	Granite block, repaved, square yards.	Gravel, square yards.	Cost.
.....	3	.....	.....	45	.....	.....	.....	81	.....	9.50	.....	.....	.....	5	.....	\$205.93
1,079	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	331.94
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	7.40
.....	.....	.....	822.00	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	691.40
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	104.20
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	4,500	117.51
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	77.20
.....	15	.....	.....	.....	.....	.....	188	77	.....	.....	.....	.....	467	.....	.....	397.82
.....	.....	.....	.....	.....	.....	.....	.....	145	.....	.....	.....	.....	.....	.....	.....	25.70
.....	.....	19.17	21.40	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	38.38
4,268	19,342	1,053.79	1,187.80	1,186	65	324	1,317	636	33.33	9.50	7	1,075	467	49	4,500	16,754.80

TABLE O.—Whole-cost work.

No.	Location.	For whom done.	Verified block paved,	Curb reset, linear feet.	Asphalt block paved,	Asphalt block repaved,	Graded, cubic yards.	Cement, square yards.	Brick sidewalk relaid,	Vit. brick roadway re-	Cobble relaid, square	Cost.
			square yards.		square yards.	square yards.			square yards.	laid, square yards.	yards.	
5001	Fourth street, near corner of F street.	Washington Brewing Co.	....	12	84	72	....	....	....	....	....	\$175.29
2	Fifteenth and U streets (northeast corner).	C. A. Didden (nothing done).	....	....	....	....	....	....	....	....	....	....
3	Alley in square 159	Fitch, Fox & Brown.	....	....	90	....	4	....	....	....	....	153.26
4	Twentieth street from north curb line to north building line Wyoming avenue.	George Truesdale (deposit returned).	....	....	....	....	....	....	....	....	....	....
5	Eleventh and F streets (at southwest corner) NW.	W. B. Moses & Son (in cement cut 114).	....	....	....	....	....	....	....	....	....	....
6	Front of 2929 Fourteenth street NW.	W. A. Miskell	....	8.80	....	....	....	....	....	....	....	1.99
7	Front of 509 and 511 H street NE.	Gustave Hartig	....	....	....	....	....	18.11	....	....	....	16.12
8	Parking space front 1026 M street NW.	J. Maury Dove	....	....	....	....	....	46.96	....	....	....	41.79
9	Parking, corner First street and Indiana avenue NW.	Metropolitan Railroad Co.	....	....	....	....	....	21.57	....	....	....	19.20
10	Parking space on Third street side of premises, southwest corner Third street and Pennsylvania avenue NW.	Charles Mades	....	....	....	....	....	86.01	....	....	....	73.74
11	Kansas avenue, between Savannah and Trenton streets (east side.)	C. J. Ubhoff	....	....	....	....	91	....	....	....	....	31.85
12	Sixteenth street, 14 Lafayette square NW.	J. S. Larcombe	60	65	....	....	....	....	17	79	97	171.54
Total			60	85.80	174	72	95	172.65	17	79	97	694.78

TABLE P.—*Number of square yards and cost charged for repairs to cuts made by plumbers and others in streets, avenues, and alleys during the year ended June 30, 1898.*

	Number.	Square yards.	Cost (amount charged).
Plumbers' cuts:			
Sheet asphalt	814	943.87	\$2,971.62
Granite block	132	648.65	875.68
Asphalt block	127	441.80	596.43
Vitrified brick and block	105	366.21	494.38
Brick	89	234.62	70.27
Cobble and rubble	313	1,322.74	595.23
Macadam	89	383.55	517.79
Granolithic	68	320.028	720.06
	1177	4,760.968	6,841.46
The following cuts have been repaired and charged to the various appropriations and deposits specified:			
Water department	344	2,730.57	2,943.30
Sewer department	520	24,899.55	10,737.91
Current repairs, streets, etc.	65	1,847.94	686.70
Street lighting	24	63.84	113.96
Repairs to concrete pavements	4	273.63	488.43
Assessment and permit, streets	1	2.05	3.65
Repairs, county roads	1	3.20	5.71
Improvements and repairs, northwest section	1	12.50	22.81
Improvements and repairs, northeast section	1	17.54	31.31
Improvements and repairs, Georgetown	1	32.64	58.26
Replacing sidewalks and curbs around public reservations	2	52.82	94.28
Clifton, etc., streets	1	17.00	30.34
Widening Tenth street	1	18.24	32.56
Connecticut avenue extended and Columbia road	1	140.00	249.90
Miscellaneous appropriations	66	1,202.73	813.93
Deposit, Capital Traction Co.	1	8.00	18.00
Deposit, Potomac Electric Power Co.	55	363.94	568.29
Deposit, United States Electric Light Co.	234	1,049.14	2,382.31
Deposit, Washington Gaslight Co.	192	840.32	1,908.21
	2692	39,336.618	28,030.82

NOTE.—The above amounts do not include the cost of surface repairs to sheet-asphalt pavements beyond the limits of cuts. Such repairs, when necessary, were executed simultaneously with the cut repairs, and charged against the proper street appropriation.

The following is a comparison between the repairs made to plumbers' cuts during the year ended June 30, 1898, and the eight preceding years:

Year.	Number.	Square yards.	Cost.
1889-90	393	2,085.06	\$3,712.06
1890-91	852	3,899.61	6,488.02
1891-92	980	5,220.50	6,994.58
1892-93	2132	8,694.67	14,025.68
1893-94	1583	9,233.25	15,272.72
1894-95	1236	6,718.57	9,267.71
1895-96	1305	11,941.03	14,156.18
1896-97	1016	15,058.07	25,530.55
1897-98 (includes gas, electric lighting, and deposit jobs, as in former years)	1659	7,022.368	11,718.27

REPORT OF SUPERINTENDENT OF ROADS.

WASHINGTON, July 20, 1898.

SIR: I have the honor to submit herewith report of operations of road department during fiscal year ended June 30, 1898.

Expenditures, repairing county roads and suburban streets, fiscal year 1897-98.

	Amount.		Amount.
CENTRAL SECTION.		CENTRAL SECTION—continued.	
Twelfth street, at Fort, NE.....	\$6.12	Brentwood road.....	\$2.75
Thirteenth street, between Milwaukee and Omaha.....	37.25	Bladensburg road.....	2.50
Thirteenth street, corner Harvard.....	3.75	Brightwood avenue.....	13.99
Bunker Hill road and Tenth street.....	23.38	Columbia road and Nineteenth street.....	1.25
Wilson street.....	93.75	Capitol avenue.....	2.12
Fourth street NE.....	30.50	Central avenue.....	2.75
Rosedale street.....	274.19	Corcoran street.....	2.13
Fourteenth street NW, extended.....	274.12	Eleventh street, Brookland.....	2.50
Sixteenth street NW, extended.....	7.62	Elm street.....	178.50
Bladensburg road.....	1.25	Fourth street NE.....	.63
Brightwood avenue.....	2.50	Fourteenth street.....	1.25
Rock Creek Church road.....	2.50	Fourteenth street and Military road.....	1.25
Eighteenth street NW, extended.....	32.80	Hartford street.....	4.87
Linnean Hill road.....	1.25	Howard avenue.....	11.37
Sixth street NW.....	45.87	Lincoln avenue.....	11.50
Providence street.....	28.25	Do.....	1.25
Montgomery street.....	47.37	Lansing street, Brookland.....	5.50
Bunker Hill road.....	355.62	Linnean Hill road.....	2.50
Tenth street, Brookland.....	2.50	Mintwood place.....	7.75
V street NE.....	19.63	Ninth street, Brookland.....	4.25
Eighteenth street from Lowell street to Howard avenue, and Howard avenue between Eighteenth and Nineteenth streets.....	302.30	Providence street.....	3.50
Sheridan street, between Sixth and Seventh.....	335.56	Queen's Chapel road.....	16.56
Elm street, between Harewood and Le Droit avenues.....	120.13	Rosedale street.....	180.63
Lydecker avenue, between Thirteenth street and Holmead avenue.....	243.50	Rock Creek Church road.....	3.75
Bladensburg road.....	1,631.97	Richmond street, Petworth subdivision.....	39.50
R street NW., between Twenty-first and Twenty-second.....	547.87	Spring road NW.....	1.25
Twenty-fourth street between U street and California avenue, and California avenue between Massachusetts avenue and Twenty-fourth street.....	74.50	Sherman avenue.....	8.00
Northeast corner Erie and Messmore streets.....	24.00	Shepherd road.....	5.50
Blair road, in vicinity of Woodburn.....	75.25	Twelfth street, Brookland.....	6.12
Riggs road, in vicinity of Woodburn.....	154.72	Thirteenth street, Brookland.....	37.25
T street NW., between First street and Le Droit avenue.....	366.63	Do.....	10.62
Pine street, between Park and Grant streets, Mount Pleasant.....	13.50	V street NE.....	14.75
Park street, between Fourteenth and Sixteenth.....	13.00	Wilson street.....	264.88
Fort street, just east of Twelfth, Brookland.....	2.75	Blair road, near District line.....	305.90
Howard avenue, Mount Pleasant.....	60.00	Frankfort, between Twelfth and Fourteenth streets, Brookland.....	93.06
Lydecker avenue, Holmead subdivision.....	26.00	Brentwood road.....	217.37
Holmead avenue, Holmead subdivision.....	27.25	Queen's Chapel road, from Bladensburg road to District line.....	20.75
Lamar street, Holmead subdivision.....	6.50	Eighth and Ninth streets, from Florida avenue to Grant street.....	478.12
Thirteenth street, Holmead subdivision.....	45.25	Whitney avenue, from Thirteenth street to Brightwood avenue.....	453.40
Chestnut and Magnolia avenues.....	6.74	Carroll avenue and other streets in Takoma Park.....	265.50
Omaha street, between Twelfth and Thirteenth.....	29.00	Rock Creek Church road, from Brightwood road to Harewood road.....	563.69
Twenty-sixth, Twenty-eighth, Thirtieth, K. I. and Lawrence streets, Morris subdivision.....	7.06	Eighteenth and Lowell streets, Ingle-side.....	16.50
Sheridan street, east of Brightwood avenue.....	48.87	Brightwood avenue, between Rock Creek Church road and District line.....	1,733.25
Milwaukee avenue, between Eleventh and Twelfth streets, Brookland.....	5.75	Sargent road, between Bunker Hill road and District line.....	297.49
Brightwood avenue.....	83.29	Oak street, between Harewood avenue and Linden street.....	269.51
Fourteenth street, between Dover and Frankfort, Brookland.....	37.00	Juniper street, from Florida avenue to Spruce street.....	151.38
Bunker Hill road, between Baltimore and Ohio Railroad and District line.....	181.75	Wallace street, Brookland, between Hartford and Frankfort.....	35.63
Bunker Hill road.....	34.56	Trumbull street (east end), Howard University subdivision.....	42.50
Argyle Mill road.....	2.75	Whitney avenue, between Thirteenth and Fourteenth streets.....	317.50
		Levis street, from Bladensburg road to Trinidad avenue.....	191.88
		Sixteenth street extended, between Kenesaw avenue and Park street.....	22.71
		Howard street between Sixth and Seventh, and Sixth street between Howard and Lincoln avenues.....	310.08
		Bunker Hill road, beyond Queen's Chapel road.....	163.24
		Grant road, along east side Florida avenue.....	83.56
			20.80

Expenditures, requiring county roads and suburban streets, fiscal year 1897-98—Cont'd.

	Amount.		Amount.
CENTRAL SECTION—continued.		WESTERN SECTION—continued.	
Columbia road, east of Eighteenth street.....	\$78.81	Brookville road, from Tennallytown road to District line.....	\$362.94
Brightwood avenue, at north side of Sheridan street.....	9.75	Loughboro road.....	538.00
Brightwood avenue, at Whitney avenue.....	15.15	Woodley road, from Connecticut avenue to Tennallytown road.....	653.25
Sixteenth street, at Rosedale.....	7.37	Grant road, from Broad Branch road to Tennallytown road.....	181.00
Streets in Ingleside.....	5.00	Erie street, between Central and Champlain avenues.....	33.75
Brightwood avenue, north of Steuben street.....	258.40	Foxhall road, between Canal and Conduit roads.....	197.93
Elm street, between Fourth and Fifth V street NW., between First and North Capitol.....	14.37	Road from Chevy Chase circle to Broad Branch road.....	269.37
V street NE., between Third and Fourth.....	3.19	California avenue, between Twenty-fourth street and Massachusetts avenue.....	182.36
Rock Creek road.....	196.75	Prospect street (Reno).....	320.87
Seventh street road.....	59.56	Forty first street.....	22.50
Queen's Chapel road.....	18.47	Wisconsin avenue, from Nebraska avenue southward.....	74.94
Bladensburg road.....	44.50	Southern approach to Chain Bridge.....	37.75
Queen's Chapel road, from Bunker Hill road to District line.....	34.25	Nineteenth street, between Wyoming avenue and Columbia road.....	18.88
School and Pine streets, Mount Pleasant.....	151.06	Canal road.....	93.25
Queen's Chapel road.....	73.75	Q street, between Twenty-second and Twenty-third NW.....	9.00
Streets in Langdon.....	31.50	Canal road.....	14.84
Dangerous holes and minor repairs.....	4,259.54	Wisconsin avenue, at north side Woodley Lane road.....	44.05
	18,007.50	Tunlaw road.....	157.69
		Dangerous holes and minor repairs.....	2,019.48
WESTERN SECTION.		EASTERN SECTION.	
Road from Broad Branch road to Chevy Chase circle.....	9.00		9,687.03
Military road.....	482.60	Nichols avenue.....	688.25
Connecticut avenue.....	57.00	Branch avenue.....	85.86
Woodley lane.....	2.50	Jackson street.....	6.50
Tennallytown road.....	2.50	Bliss avenue.....	152.99
New Cut road.....	10.50	Pennsylvania avenue extended.....	12.00
Ridge road.....	1.25	Minnesota avenue.....	20.25
Broad Branch road.....	1.25	Howard avenue.....	5.50
Pierce Mill road.....	1.25	Good Hope road.....	46.00
Loughboro road.....	1.25	Wheeler road.....	5.25
Thirty-seventh street, between U and W.....	153.25	Sheridan and Nichols avenues.....	7.50
Tennallytown road.....	828.88	Branch avenue, near Bowen road.....	301.43
Thirty-fourth and Newark, and streets in Cleveland Park.....	76.50	Nichols avenue, between Stickfoot Branch and Insane Asylum gate.....	101.00
Road from Broad Branch road to Chevy Chase circle.....	431.37	Southeast corner Jackson and Adams streets, Anacostia.....	7.50
Grant road, from Wisconsin avenue 1,100 feet eastward.....	111.00	Branch avenue, between Bowen road and Pennsylvania avenue.....	251.94
Do.....	198.44	Giesboro road, between Hamilton road and District line.....	17.25
Canal road, west of Thirty-sixth street.....	25.00	Livingston road.....	32.25
Rock Creek Ford road.....	103.00	Hamilton road.....	60.75
Des Moines, from Forty-first street to Tennallytown road.....	361.44	Hillsdale, streets in.....	148.75
Connecticut avenue and Grant road.....	6.75	Wheeler road.....	124.13
Military road, near Brightwood.....	205.50	Minnesota avenue, between Harrison street and Pennsylvania avenue.....	165.00
Pierce Mill road, from Broad Branch road to Tennallytown road.....	371.37	Suit road, between Bowen road and District line.....	70.50
Broad Branch road.....	2.50	Giesboro road.....	78.25
Canal road.....	6.25	Monroe street.....	7.00
Connecticut avenue.....	15.68	Nichols avenue.....	1.25
Do.....	123.24	Sheriff road.....	417.12
Des Moines street.....	17.75	Nichols avenue, from Stanton street.....	2.75
Erie street.....	49.56	Bennings road, from Eastern Branch to District line.....	93.09
Loughboro road.....	1.25	Lincoln and Burkeville.....	264.75
Military road.....	339.63	Walker and Naylor roads.....	162.00
New Cut road.....	1.25	Nichols avenue.....	172.50
Pierce Mill road.....	1.25	Good Hope road.....	50.00
Road from Broad Branch road to Chevy Chase circle.....	84.00	Nichols avenue, from Asylum to Hamilton road.....	65.25
Ridge road NW.....	1.25	Monroe street, from Baltimore and Ohio Railroad to Harrison street.....	468.82
Tennallytown road.....	39.25	High View avenue, Anacostia.....	51.50
Tunlaw road.....	1.25	Bennings road, from H street to bridge.....	65.75
Woodley lane.....	1.25	Dangerous holes and minor repairs.....	90.12
Albemarle street.....	267.72		2,143.56
Connecticut avenue, south of Klinge road bridge.....	16.00		6,699.18
Massachusetts avenue extended (Kalorama).....	43.00		
Foxhall road, between Conduit and Canal roads.....	2.50		

SUMMARY.

Central section	\$18,007.50
Western section	9,687.03
Eastern section	6,669.18
Fuel	52.23
Tools	215.73
Blacksmithing	435.33
Hire of teams for chain gang	497.00
Hire of horse and buggy	313.00
Purchase of steam roller	1,000.00
Repairing steam roller	1.73
Salaries, property office	48.00
Salaries, surface division	1,320.00
Rolling, sprinkling, and miscellaneous labor	1,752.53
Total	39,999.26

Under appropriation for "Current repairs, county roads, etc., 1898," the principal roads and streets repaired were as follows: On Nichols avenue, grading, graveling, and paving gutters; Bladensburg road, graveling and general repairs; R street NW., between Twenty-first and Twenty-second streets, grading, graveling, and laying gutter; Tennallytown road, graveling; new road between Chevy Chase Circle and Broad Branch road, grading, graveling, and relaying gutter; T street NW., between First street and Le Droit avenue, grading, graveling, and paving gutters; Des Moines, from Forty-first street to Tennallytown road, graveling and guttering; Pierce Mill road, from Broad Branch road to Tennallytown road, graveling; Brookville road, from Tennallytown road to District line, graveling; Loughboro road, graveling; Woodley road, from Connecticut avenue to Tennallytown road, graveling; Eighth and Ninth streets, from Florida avenue to Grant street, graveling; Whitney avenue, from Thirteenth street to Brightwood avenue, graveling and cleaning gutters; Rock Creek Church road, from Brightwood road to Harewood road, graveling; Brightwood avenue, between Rock Creek Church road and District line, graveling.

GEO. N. BEALE,
Superintendent of Roads.

Capt. LANSING H. BEACH,
Corps of Engineers, U. S. A., Engineer Commissioner, District of Columbia.
(Through the Computing Engineer.)

REPORT OF THE ENGINEER OF BRIDGES.

WASHINGTON, D. C., July 1, 1898.

CAPTAIN: I have the honor to submit the following report for the fiscal year ending June 30, 1898:

The following expenditures have been made under the appropriation for "Ordinary care of bridges:"

Appropriation	\$3,500.00
Salaries, bridge keepers, etc	\$3,216.72
Painting bridge No. 34	195.79
Coal and stove grate	23.25
Chairs and brooms	4.24
Bicycle for foreman	60.00
	3,500.00

Bridge keepers have been maintained at the Pennsylvania avenue, Anacostia, and Aqueduct bridges, the importance and continually increasing travel over these much-used thoroughfares requiring careful and constant attention for cleaning and keeping the surface in proper condition and for enforcing needful rules in regard to travel.

CONSTRUCTION AND REPAIR OF BRIDGES.

Under this appropriation but little more can be done than to keep the present structures in fair condition. In the way of repair the principal item of expense was a new floor on the Anacostia bridge, a portion of the lumber for which was purchased from the appropriation for 1897. A new floor was also laid between the tracks and rails on bridge No. 30, crossing Rock Creek on the line of Connecticut avenue.

The plank sidewalk on the south approach to the Pennsylvania avenue bridge, which had become badly worn and decayed, was replaced by a cement sidewalk.

The ironwork of the Chain Bridge (No. 1), the Woodley Lane Bridge (No. 31), and the bridge across Rock Creek near Massachusetts avenue (No. 32) was thoroughly painted, and is now in good condition.

Bridges 15, 16, 18, and 48 were replaced by masonry culverts, and bridges 28 and 29 by cast-iron 36-inch pipe. This was done in pursuance of the policy of substituting, wherever practicable, a durable and permanent structure of masonry or iron for perishable wood. A new masonry culvert was built over Broad Branch at the junction of Broad Branch road and the portion of the Military road leading southwest toward Tennallytown.

The bridge on the Argyle Mill road, known as No. 14, which was a wooden structure of two spans about 50 feet each, had become much decayed and weakened, and contract was made for steel-plate girders. The structure has been delivered and also the material for the floor. The work of erecting the bridge will be done after July.

The contract for widening the P Street Bridge, under the special appropriation for that purpose, was awarded to J. C. McGuire, and is well under way. It will be completed early in the coming year. When complete, it will give a continuous roadway of 40 feet, the same as on P street, and ample sidewalks, and, while greatly improving the appearance of the bridge, will prove a great relief to the traveling public.

The recommendations of past years in regard to the reconstruction of the K and M Street bridges across Rock Creek, and the Anacostia or Navy-Yard Bridge across the Eastern Branch, are again repeated. The need of a more substantial structure for the last-named bridge especially is emphasized and made more apparent by the increased strain to which it is subject in the use of the heavy motor cars of the Capital Railway. The bridge is old and was not originally designed for such service.

In recognition of the need of increased facilities for communication between the city and suburban districts, Congress, by the act approved March 3, 1897, provided for the preparation by the Chief of Engineers of the United States Army of plans for a stone arch, and also for a steel bridge over Rock Creek on the line of Massachusetts avenue extended, and, by the same act, the Commissioners of the District were authorized to secure by competition, designs for a bridge or viaduct across Rock Creek on the line of Connecticut avenue extended. In pursuance of this act plans for the Massachusetts Avenue Bridge were prepared by the Chief of Engineers, and, after the receipt of competitive designs by the Commissioners for the Connecticut Avenue Bridge, the design of George S. Morison was recommended for adoption. The result having been reported to Congress by the Secretary of War in House document 163, Fifty-fifth Congress, second session, and by the Commissioners in Senate document 96, Fifty-fifth Congress, second session, provision was made by the act approved June 30, 1898, for the commencement of these structures by the appropriation of \$25,000 in each case toward the construction of foundations.

Expenditures construction and repair of bridges, 1898.

Order.	Bridge.	Character of work.	Cost.
6001	-----	Culvert on Michigan avenue, lay cast-iron pipe a	\$172.37
6002	55	Lay new floor b	2,160.37
6003	31	Paint ironwork	539.40
6004	32	Paint and repair floor	275.75
6005	-----	Various bridges, repairs, September 1 to 15	34.05
6006	54	Repairs to sidewalk	28.00
6007	77	Repair floor	17.00
6008	35	Repair sidewalk	2.75
6009	-----	Culvert on Branch avenue, repair	6.58
6010	-----	Frames for signboards	2.25
6011	55	Repair floor	44.71
6012	26	do	82.91
6013	18	do	14.75
6014	78	do	37.08
6015	34	do	2.25
6016	-----	Various bridges, repairs, September 16 to 30	7.38
6017	-----	Various bridges, repairs, October 1 to 15	19.74
6018	-----	Various bridges, repairs, October 16 to 31	29.57
6019	30	Relay floor between tracks and rails	982.53
6020	27	Repair floor	56.34
6021	55	Put additional weight on draw	124.69
6022	55	Lay new sidewalk	988.43
6023	24	Repair floor	57.23
6024-6032	-----	Various bridges, repairs, November 1, 1897, to February 16, 1898	116.25
6033, 6034	-----	Various bridges, cleaning and repairing, March 1 to 15	55.25
6035	35	Paint	117.20
6036	35	Lay new floor in roadway	786.57
6037	28 and 29	Change to 36-inch pipe culverts	249.27

Expenditures construction and repair of bridges, 1898—Continued

Order.	Bridge.	Character of work.	Cost.
6038	.....	Various bridges, repairs, March 16 to 31.....	\$1.37
6039	48	Replace with masonry arch.....	343.37
6040	1	Paint.....	880.35
6041	14	Replace with steel plate girder c.....	1,020.04
6042	.....	Culvert on Bliss avenue, relay with 24-inch pipe.....	338.90
6044	.....	Culvert on Rock Creek Church road, grating and basin.....	63.88
6045	18	Replace with masonry arch.....	443.18
6046	16	do.....	631.72
6047	.....	Intersection of Broad Branch and Military roads, masonry culvert.....	480.48
6048	.....	Various bridges, repairs, April 16 to 30.....	11.13
6049	15	Replace with masonry arch.....	753.16
6052	.....	Branch avenue, repair culvert.....	25.25
6053	.....	Culvert, Harrison avenue, repair.....	80.81
6054	54	Lay cement sidewalk in place of plank.....	532.70
6055, 6056	.....	Various bridges, repairs, June 1 to 15.....	1.50
6058	14	Labor on plate girder bridge.....	35.50
.....	7	Lumber for repairs of floor.....	42.93
.....	55 and 34	Paint purchased for work in progress.....	454.25
.....	35	Lumber for sidewalk.....	110.85
.....	.....	Salaries.....	1,020.00
.....	.....	Tools purchased and repaired.....	84.25
.....	.....	Brick and cement purchased on hand.....	62.90
Total.....			14,979.13
Balance of appropriation.....			21.87
Grand total.....			15,000.00

a Pipe purchased, 1897.

b Lumber partially purchased in 1897.

c Material.

Respectfully submitted,

GEO. H. BAILEY,
*Engineer of Bridges.*Capt. LANSING H. BEACH,
Corps of Engineers, U. S. A., Engineer Commissioner, District of Columbia.
(Through the Computing Engineer.)

REPORT OF THE SUPERINTENDENT OF SEWERS.

WASHINGTON, D. C., August 19, 1898.

CAPTAIN: I have the honor to submit the following report of the operations of the sewer division for the fiscal year 1897-98.

Under the appropriation for cleaning and repairing sewers and basins, work was performed as follows: 116,804 linear feet of pipe sewers, 8,898 linear feet of brick sewers, 6,845 manholes; 95,551 receiving basins were cleaned, from which were removed 7,783 cubic yards (estimated) of street detritus and sludge; 3,640 feet of pipe sewers were taken up and relaid; 1,898 linear feet of brick sewers were repaired; 6 receiving basins were constructed; 55 receiving basins were reconstructed; 220 receiving basins were repaired; 32 tops (artificial and bluestone) were replaced; 96 basin covers (cast iron) were replaced; 8 receiving basins were abandoned; 94 receiving-basin outlets were cleaned; 12 manholes were constructed; 23 manholes were reconstructed; 116 manholes were adjusted to grade; 198 manholes were repaired; 48 manhole frames and covers were replaced; 163 manhole covers were replaced; 5 alley drops were constructed, and 33 alley grates and frames were replaced. Total number of jobs, 1,388; of minor repairs, 538.

The flushing gates at the outlet end of the Tiber sewer were advantageously operated throughout the year.

The tidal sewers and sediment chambers were cleaned with regularity. One flushing gang was employed throughout the year.

The reconstruction of the main sewer in Sixth street SE. between K and N streets was completed. Seven hundred and forty five feet of the invert of Slash Run sewer and 125 feet of the invert of North Capitol street sewer were reconstructed with cunettes for dry-weather flow. The amount expended for cleaning catch basins was \$12,018.33.

Under the appropriation for replacing obstructed sewers there were constructed, under contract, 2,306.70 linear feet of 12-inch sewer, from appropriation 1897, and 617 linear feet of 18-inch sewer from appropriation 1898, and by day labor 9,064

linear feet of pipe sewer, varying from 6 to 24 inches in diameter, 579 linear feet of lateral connections, 42 manholes, and 1 basin.

Under the appropriation for permit work there were constructed, by contract and day labor, 6,183 feet of pipe sewers, varying from 8 to 12 inches in diameter, and 25 manholes, divided among 24 jobs, averaging in cost per job \$261.21; in length of sewer per job, 257.6 linear feet; in cost per linear foot, \$1.015.

Under the assessment system there were constructed by day labor 19,942 linear feet of pipe sewers, varying in diameter from 6 to 12 inches, 120 manholes, and 11 receiving basins, divided among 78 jobs, averaging in cost per job \$344.34; in length of sewer per job, 255.2; and in cost per linear foot, \$1.44.

Sewers were constructed at applicants' cost, aggregating 707 linear feet, varying from 8 to 15 inches in diameter, and 10 manholes, divided among 8 jobs, averaging in cost per job \$122.15.

Under the appropriation for main and pipe sewers main sewers were constructed under contracts, in L street NW., between North Capitol and First streets, in Four-and-a-half street SW., between E and School streets; and the main sewer in O street, Georgetown, was extended eastward to Rock Creek. Under the appropriation for 1897, 9,572 linear feet of pipe sewers, varying from 12 to 24 inches in diameter, and under the appropriation for 1898, 581.1 linear feet of sewer, 24 inches in diameter, were constructed. By day labor there were constructed 17,296 linear feet of pipe sewers varying from 6 to 24 inches in diameter, 41.5 linear feet of 3-foot diameter brick sewer, 122 manholes, and 90 receiving basins.

Under the appropriation for suburban sewers, main sewers were constructed in Lincoln avenue NE., between R and T streets; Meridian street, between Erie and Huron streets; W street NW., between First and North Capitol streets; North Capitol street, between W and Detroit streets; Morris road, Anacostia, from Nichols avenue southward 500 feet. There were also constructed 11,110.26 linear feet of pipe sewers, varying from 12 to 24 inches in diameter, under appropriation for 1897, and 4,828.05 linear feet of pipe sewers 15 to 24 inches in diameter under appropriation for 1898. By day labor there were constructed 7,610 linear feet of pipe sewers, varying from 6 to 24 inches in diameter, 36 linear feet of cast-iron pipe sewer 24 inches in diameter, 76 linear feet of 3.75 by 5.625 foot diameter brick sewer, and 46 manholes.

The trunk sewer in the valley of Piney Branch, work on which was commenced in the fiscal year 1897, was completed to a point in Brandywine street a short distance east of Seventh street. A large amount of rock excavation was required in the various sections of this work.

The following work was performed for the surface division and charged to the various appropriations for the improvement and repair of streets and roads: 1,017 linear feet of pipe sewer were constructed, varying from 8 to 24 inches in diameter; 2 manholes were constructed, and 78 receiving basins were constructed, reconstructed, or abandoned.

Under the appropriation for automatic siphons, 7 flushing basins were constructed and 1 basin was repaired.

Contract No. 2220, with John Jacoby, for constructing a portion of the upper section of the Rock Creek and B street intercepting sewer from the intersection of P street with Florida avenue to the intersection of Twenty-fifth and Water streets was completed, and the sewer is now in service. In constructing this sewer across M street, the large water main in that street, which rested upon filled ground of poor character, was supported by steel girders which spanned the sewer line. These were left in position after the completion of the sewer work. They are inclosed and accessible for painting and inspection.

The crossings of Slash Run and Boundary sewers required the reconstruction of the outlet ends of these sewers.

The intercepting sewer in Fifteenth and F streets was completed within the year. This work was performed with little actual discomfort to the public, the only event of note being the heavy rain storm of May 13, 1897, which caused caving of the side of the excavation where the section was enlarged at the junction with the Thirtieth street sewer. Travel on the electric railway was delayed several hours as a result.

Nine hundred and thirty-two feet of the Tiber Creek and New Jersey avenue high-level intercepting sewer were constructed under contract No. 2446, with J. K. Murphy, within the lines of Garfield Park.

The work performed to date upon the project for sewage disposal consists in the construction of the F street and Easby Point intercepting sewer, the upper portion of the Rock Creek and B street intercepting sewer, and 932 feet of the Tiber Creek and New Jersey avenue high-level intercepting sewer. The F street and Easby Point intercepting sewer diverts into the channel of the Potomac River all the drainage from the area north of its location and west of Seventh street which formerly discharged into the B street sewer system. The completed portion of the Rock Creek and B street intercepting sewer intercepts and diverts into the channel of the Potomac River the sewage which was formerly discharged into Rock Creek. Little

improvement in conditions of the drainage system would be effected by constructing any one of the remaining portions of the project; the completion of the project is required for any further appreciable benefit.

I respectfully invite attention to an absence of equity in the construction of service sewers. In consideration of the fact that the larger sewers are larger and more expensive because they are required to serve as outlets for smaller sewers, it has seemed unfair that they should be charged against the abutting property, and the practice of the office is to construct sewers of greater size than 12 inches in diameter from the appropriation for main and pipe sewers or the appropriation for suburban sewers. Sewers 12 inches in diameter and under are usually constructed under the assessment system, in which case one-half of the cost is taxed against the abutting property. According to this practice, property abutting upon sewers above 12 inches in diameter is not taxed on account of the sewer construction, although it receives as much benefit as property which is taxed for the construction of sewers under the assessment system. Again, under the assessment system, the owner of the corner lot is, in many instances, compelled to pay as much as five times the amount assessed against the adjacent lot of equal area, each receiving equal benefit. In my opinion all properties abutting upon a service sewer should pay a proportion of its cost, and assuming the average cost of 12-inch sewers as a foundation, \$7.50 for each 1,000 feet of lot area would place the charge upon a fair basis.

Aggregate length of sewer construction during the fiscal year 1897-98: Main sewers, 13,540.2 feet (2.564 miles); pipe sewers, 78,403.55 feet (14.849 miles); pipe sewers relaid, 9,462.6 feet (1.793 miles).

Total length of sewers in the District of Columbia: Main sewers, 443,109 feet (83.92 miles); pipe sewers, 1,578,215 feet (298.91 miles).

Tables numbered from 1 to 10 are transmitted herewith.

Table No. 1 shows sewers constructed under contract chargeable to sewer appropriations for the fiscal year 1898.

Table No. 2 shows sewers constructed under various contracts chargeable to sewer appropriations for fiscal years 1895, 1896, and 1897, completed in fiscal year 1898.

Table No. 3 shows work done by day labor under the permit system and at the whole cost of applicant.

Table No. 4 shows work done by day labor under the assessment system.

Table No. 5 shows work done by day labor under the appropriation for replacing obstructed sewers.

Table No. 6 shows work done by day labor under the appropriation for main and pipe sewers.

Table No. 7 shows work done by day labor under the appropriation for suburban sewers.

Table No. 8 shows work done under miscellaneous appropriations and appropriations for flushing basins.

Table No. 9 shows number of inspectors, overseers, and other employees of the sewer and property divisions, and engineer stables temporarily required, and appropriations from which paid.

Table No. 10 shows average cost per linear foot of sewers constructed by day labor.

Very respectfully, your obedient servant,

D. E. McComb,
Superintendent of Sewers.

Capt. LANSING H. BEACH,
*Corps of Engineers, U. S. A.,
Engineer Commissioner, District of Columbia.*

TABLE 1.—Statement of sewers constructed under contracts

No. of contract.	Contractor.	Location.	Size of sewer.	Length.	Contract price per foot.
2515	Andrew Gleeson....	Sixth street SE., between K and L.	6 feet 3 inches diameter. 4 feet 3 inches diameter.	Feet. 60 215.2	
2520	E. G. Gummel.....	E street SW., between Four-and-a-half and Sixth.	18-inch.....	617	\$1.35
2520	.....do	L street NW., between North Capitol and First.	2.5 by 3.75 feet... 2.25 by 3.75 feet...	5 727.9 171.5	25.00
2521	John Jacoby.....	M street NW., between Thirtieth and Thirty-first.	24-inch.....	581.1	1.90
2521	.....do	Q street NW., between Twenty-fifth and Twenty-sixth.	4 feet diameter.....	4 202.8	35.00
2522	Adam McCandlish..	Four-and-a-half street SW., between E and School.	2.75 by 4.125 feet... 2 by 3 feet.....	72.15 265.37	
2405	.....do	Valley of Piney Branch, between Fourteenth and Trenton streets.	24-inch..... 21-inch.....	2,020.66 916.29	1.50 1.85
2520	E. G. Gummel.....	Lincoln avenue NE., between R and T streets.	Manholes..... 2.25 by 3.375 feet..	7 4 557.15	25.00 35.00
2520	.....do	Meridian street, between Erie and Huron.	2 by 3 feet..... 2.75 by 4.125 feet..	550.35 550.95	
2542	R. M. Moore & Co...	Klingbe road.....	15-inch.....	1,891.1	.59
2523	Lyons Bros.....	Morris road.....	Manholes..... 2.50 by 3.75 feet...	6 135.35	15.00
2446	J. K. Murphy.....	Tiber Creek and New Jersey avenue high-level intercepting sewer.	2 by 3 feet.....	500.33	

chargeable to sewer appropriations for the fiscal year 1898.

Allowance to contractor.	Materials furnished.		Cost of inspection.	Cost of repairs to pavements.	Total cost.	Appropriation.
	Chargeable.	Not chargeable.				
\$2,727.29	\$472.25	\$1.44	\$221.50	.....	\$3,422.48	Cleaning and repairing sewers and basins.
} 848.04	112.49	181.45	52.00	\$155.92	1,349.90	Replacing obstructed sewers.
3,374.21	1,247.40	88.94	327.50	210.95	5,199.00	Main and pipe sewers.
} 1,057.09	126.00	324.79	120.50	131.27	a 1,759.65	Do.
1,847.87	295.95	5.80	116.00	.....	2,265.62	Do.
1,069.08	414.10	10.84	104.00	99.54	1,727.06	Do.
} 16,087.78	697.90	1,890.14	1,030.00	.....	b 19,205.82	Suburban sewers.
2,977.64	1,381.30	18.70	224.00	.....	4,601.64	Do.
1,926.98	814.17	9.35	152.00	.....	2,902.45	Do.
} 1,834.55	187.55	346.59	68.00	.....	2,436.69	Do.
1,890.34	829.78	16.64	356.00	276.49	3,369.25	Do.
40,902.22	.....	.....	1,383.00	.....	c 42,375.22	Tiber Creek and New Jersey avenue high-level intercepting sewer.

a Includes \$8 for inspection, deducted from amount due contractor.
b Includes \$24 for inspection, deducted from amount due contractor.
c Work incomplete; payment made on account.

TABLE 2.—Sewers constructed under various contracts chargeable to various sewer

No. of contract.	Contractor.	Location.	Size of sewer.	Length.	Contract price per foot.
				<i>Feet.</i>	
			6 feet 6 inches diameter.	1,740.9	-----
			6 feet diameter.....	5,990.5	-----
			Ball connection.....	24	-----
			18-inch.....	268.2	-----
			16-inch.....	931.1	-----
			20-inch brick.....	39.4	-----
2220	John Jacoby a.....		24-inch cast-iron pipe.	704.2	-----
			30-inch cast-iron pipe.	150	-----
			Wrought-iron truss bridge.	1	-----
			24-inch pipe.....	220	-----
			Slash Run sewer.	174	-----
2387	Adam McCandlish a	Alley, between Richmond and Savannah streets and Minnesota and Brightwood avenues, and on Brightwood avenue between Quincy and Savannah streets, and on Quincy street between Brightwood avenue and Eighth street.	18-inch.....	3,273	\$1.27
			Manholes.....	9	25.00
2390	R. M. Moore & Co a.	Illinois avenue, between Brandywine and Flint streets, and on Brightwood avenue between Flint and Niagara streets.	12-inch.....	3,991	.85
			Manholes.....	13	25.00
			6 feet 6 inches diameter.	743.4	-----
			6 feet 3 inches diameter.	1,064.9	-----
			6 feet diameter.....	268.1	-----
2328	Lyons Bros a.....	Fifteenth street, between Pennsylvania avenue and F street, and on F street between Seventh and Fifteenth streets.	4 feet 6 inches diameter.	839.1	-----
			Ball section.....	84	-----
			2-foot 6-inch connection.	40	-----
			3-foot connection.	121.7	-----
			3-foot 6-inch connection.	120.2	-----
			4 feet 3 inches diameter.	662.8	-----
2394	E. G. Gummel a.....	P street, between Thirty-first and Valley.	12-inch.....	1,138.05	.92
2394	.....do.....	C street NE., between Delaware avenue and First street.	12-inch.....	651.65	.86
			Manholes.....	3	25.00
2394	.....do.....	T street NW., between Ninth and Tenth.	12-inch.....	517	.88
			Manholes.....	3	26.00
2393	Andrew Gleeson.....	Sixth street SE., between K and N.	6.25 feet diameter.	466.6	-----
			4.5 feet diameter..	302.6	-----
			Ball section.....	12.2	-----
2394	E. G. Gummel a.....	S street NW., between Florida and Connecticut avenues.	21-inch.....	123.6	1.57
			Manholes.....	1	28.00
2394	.....do.....	D street NE., between Thirtieth street and Tennessee avenue.	21-inch.....	645.9	1.34
			Manholes.....	4	28.00
2394	.....do.....	Thirteenth street NE., between C and D.	15-inch.....	387.5	1.02
			Manholes.....	1	28.00
2394	.....do.....	Thirty-seventh street, between N and O.	18-inch.....	384.74	1.46
			Manholes.....	1	28.00
			24-inch.....	646.75	1.57
2394	.....do.....	Fifteenth street SE., between Georgia avenue and C street.	21-inch.....	430.1	1.35
			15-inch.....	472.5	1.01
			Manholes.....	2	27.00
				4	28.00
2394	.....do.....	Fourteenth street SE., between East Capitol and A.	21-inch.....	372.1	1.40
			Manholes.....	2	28.00
2394	.....do.....	Square 1075.....	15-inch.....	308.7	1.12
			Manholes.....	2	28.00
2394	.....do.....	G street NW., between New Hampshire avenue and Twenty-seventh street.	24-inch.....	70.8	1.52
			21-inch.....	587.2	1.36
			Manholes.....	5	25.00

a This report includes work accounted for in annual report of fiscal year 1897.

b Includes \$35.10 for repairing water-service pipes.

c Repaired bottom of sewer.

appropriations for fiscal years 1895, 1896, and 1897, completed in fiscal year 1898.

Allowance to contractor.	Materials furnished.		Cost of inspection.	Cost of repairs to pavements.	Total cost.	Appropriation.
	Chargeable.	Not chargeable.				
\$117,837.81	\$18,169.85	\$572.53	\$1,552.50	\$480.40	\$138,613.09	Rock Creek and B street intercepting sewer.
5,459.37	468.00	834.36	176.00	.....	6,937.73	Suburban sewers, 1897.
3,297.82	472.08	542.12	162.00	.....	4,474.02	Do.
54,838.60	7,308.85	80.31	486.00	.....	62,713.76	Fifteenth and F streets portions Easbys Point intercepting sewer.
908.97	140.00	160.12	48.00	147.88	1,404.97	Replacing obstructed sewers, 1897.
551.41	84.00	95.57	39.00	264.76	1,034.74	Do.
453.00	81.25	86.87	28.00	9.40	658.52	Do.
7,407.89	1,861.04	2.27	310.00	.....	9,581.20	Cleaning and repairing sewers and basins, 1897.
186.68	31.00	47.92	7.00	16.06	288.66	Main and pipe sewers, 1897.
822.27	126.04	236.37	80.00	2.08	1,266.76	Do.
392.66	52.00	78.96	40.00	.42	564.04	Do.
524.81	60.00	103.19	22.00	16.36	726.36	Do.
1,981.00	277.00	583.21	81.00	.....	2,922.21	Do.
504.61	70.00	138.05	13.00	.....	725.66	Do.
352.02	45.00	65.89	16.00	.....	478.91	Do.
905.28	125.00	256.08	56.00	81.82	1,424.18	Do.

d Includes \$22.50 for 450 linear feet of 6-inch pipe which was erroneously deducted from the contractor, but was paid for on a separate voucher.

TABLE 2.—Sewers constructed under various contracts chargeable to various sewer

No. of contract.	Contractor.	Location.	Size of sewer.	Length.	Contract price per foot.
				<i>Fect.</i>	
2394	E. G. Gummel.....	{ W street NW., between Fourteenth and Fifteenth. New Hampshire avenue NW., between V and W streets. V street NW., between New Hampshire avenue and Seventeenth street.	24-inch.....	944.3	\$1.96
			21-inch.....	552.85	1.57
			18-inch.....	600.3	1.58
			Manholes.....	5	30.00
				3	28.00
2397	Jas. McCandlish....	{ Sixteenth street SE., between Georgia avenue and D street.	21-inch.....	404	1.40
			18-inch.....	257.5	1.37
			12-inch.....	137.2	.87
			Manholes.....	2	25.00
				1	30.00
2397	.....do	{ G street NW., between Eighteenth and Nineteenth.	18-inch.....	344.35	1.37
			15-inch.....	121.95	1.25
			12-inch.....	995.75	.95
			Manholes.....	3	27.00
				4	25.00
2397	.....do	{ S street NW., between Thirty-fourth and Thirty-fifth.	15-inch.....	353.5	.99
			Manhole.....	1	25.00
2399	Wormley & Bolden..	{ Seventeenth street SE., between B street and Massachusetts avenue.	24-inch.....	553	1.80
			Manholes.....	2	24.00
2399	R. M. Moore & Co...	{ Piney Branch Valley, Trenton, and Brandywine streets.	21-inch.....	5,043.2	1.39
			Manholes.....	19	25.00
2394	E. G. Gummel.....	{ Woodley road, between Connecticut and Belmont avenues, and Connecticut avenue between Woodley road and Kalorama avenue.	24-inch.....	217	1.41
			21-inch.....	763.36	1.32
			Manholes.....	2	26.00
2394	.....do	{ Twentieth street, between Woodley road and Kalorama avenue.	12-inch.....	205.5	.80
			Manhole.....	1	25.00
2394	.....do	{ Kalorama avenue, between Nineteenth and Twenty-third streets.	12-inch.....	1,005	.83
			Manholes.....	4	22.00
2394	.....do	{ Providence street, between Twelfth and Thirteenth.	15-inch.....	659.7	1.00
			Manholes.....	3	27.00
2407	W. H. H. Allen.....	{ Hampton place, between Twentieth street and Rock Creek, and Twentieth street between Hampton place and Cincinnati street.	30-inch, brick.....	507	4.84
			24-inch.....	338.5	1.69
			Manholes.....	1	150.00
2518	B. J. Coyle	{ W street NW., between North Capitol and First, and North Capitol between W and Detroit streets.	5 feet 3 inches diameter.	1,461.73	.....
			5 feet diameter....	992.12	.....

appropriations for fiscal years 1895, 1896, and 1897, completed in fiscal year 1898—C't'd.

Allowance to contractor.	Materials furnished.		Cost of inspection.	Cost of repairs to pavements.	Total cost.	Appropriation.
	Chargeable.	Not chargeable.				
\$3,481.29	\$413.75	\$327.70	\$219.00	\$200.32	\$5,142.06	Main and pipe sewers, 1897.
980.47	129.08	233.36	52.00	5.18	1,400.09	Do.
1,604.09	173.80	306.44	32.00	233.88	2,440.21	Do.
327.44	48.57	75.13	14.00	9.98	475.12	Do.
902.01	95.11	279.09	a 60.00	.....	1,336.21	Do.
11,283.33	1,039.82	1,816.21	1,314.00	140.71	15,594.07	Suburban sewers, 1897.
1,223.82	184.91	383.24	45.00	379.36	2,216.33	Do.
156.40	25.00	30.88	8.00	.....	220.88	Do.
830.41	106.00	148.10	58.00	512.54	1,655.05	Do.
631.70	92.22	140.64	64.00	.....	928.56	Do.
3,048.74	634.87	178.02	254.00	.....	4,115.63	Do.
14,220.16	3,267.28	43.48	624.50	.....	18,160.42	Do.

a Includes \$48 charged to contractor.

TABLE 3.—Statement of sewers laid under the appropriation for assessments

PERMIT

No. of order.	Location.	Pipe sewers laid (length in feet).			Manholes.	Branches.
		8-inch.	10-inch.	12-inch.		
	Seventeenth street, from Corcoran street north.					
13	Private roads of Cleveland Park	1,548			5	6
	C street NE., between Twelfth and Thirteenth (north side).			176		10
28	Florida avenue NW., between Eighteenth and Nineteenth streets.	51				3
24	Fifth street NW., between D and E (west side).			219		6
20	Square 577	11				1
18	Square 520		14			2
16	Square 520		11			2
17	Square 503		39			3
14	I street NE., between Eleventh and Twelfth (south side).	11				1
33	Kenesaw avenue NW., between Fifteenth and Sixteenth streets.			32		1
	Klingie road and private roads of Cleveland Park.			2,501	9	4
29	Newark street, Cleveland Park	119				1
23	C. F. Norment's subdivision		275		3	7
22	Square 132	51			1	6
21	Q street NW., between Twenty-second and Twenty-third.		57			3
80	Randolph street NE., between Third and Fourth.			35		1
26	Square 777	11				1
32	Thirty-sixth street NW., between Prospect and N.		139		1	2
31	Square 1015			94		2
34	Twentieth street NW., between Wyoming and Kalorama avenues.		135	129	2	12
25	Twenty-second street NW., between R and Decatur, and Decatur street from Twenty-second street westward.		105	94	2	8
27	Thirty-sixth street NW., between O and P.		116		1	4
19	Thirtieth street NW., between Cambridge and Irving.			184	1	5
15	Twelfth street NW., between S street and Vermont avenue.		26			1
	Total	1,802	917	3,464	25	92

a All work, except repairs to pavements, accounted for in annual report of 1897, and the cost of same is included.

b Balance brought forward from Klingie road.

c Constructed under contract No. 2542 by R. M. Moore & Co.

WHOLE

No. of order.	Location.	Pipe sewers laid (length in feet).				Manholes.
		8-inch.	10-inch.	12-inch.	15-inch.	
1	Wallach street NW., between Thirteenth and Fourteenth.		100	6		2
2	1629 Massachusetts avenue, in front of				3	1
3	Square 860	84				2
304	Cedar street (square 132)	100				1
307	L street NW., between Sixth and Seventh			27	73	1
308	Square 162			9		
306	Square 913	128				1
309	R street NW., between Seventh street and Rhode Island avenue.	78				
305	Square 617	99				2
	Total	489	100	42	76	10

and permit work and the whole cost to applicant for the fiscal year 1898.

SYSTEM.

Amount of deposit.	Cost to District of Columbia.	Cost to property owner.	Total cost.	Amount returned.	For whom done.	Overseer.	Date of completion.
\$8.00	\$7.77	\$7.78	a \$15.55	\$0.22	J. R. Marshall, agent..	Thomas...	Sept. 3, 1897
(b)	493.28	493.27	c 986.55	(d)	M. W. Wines	Lanigan ..	May 9, 1898
135.00	109.38	109.38	218.76	25.62	W. A. Kimmel	Prince	May 10, 1898
91.00	18.85	18.85	37.70	72.15	Charles W. Needham	do	May 17, 1898
180.00	130.08	130.04	260.07	49.96	Johanna Derwan	Ward	Mar. 31, 1898
6.00	5.08	5.08	10.16	.92	G. H. Berger	Prince	Jan. 28, 1898
22.00	8.58	8.58	17.16	13.42	Mrs. Annie B. Gaegler	Thomas ..	Jan. 11, 1898
10.00	7.20	7.20	14.40	2.80	John E. Beall	Prince	Jan. 22, 1898
35.00	16.13	16.14	32.27	18.86	George P. Newton	Lanigan ..	Nov. 6, 1897
12.50	5.33	5.33	10.66	7.17	A. H. Whitlark	do	June 2, 1898
28.00	13.92	13.93	27.85	14.07	.....	.....	.....
2,900.00	1,219.57	1,219.58	e 2,439.15	(e)	John Sherman	Prince	May 14, 1898
66.00	42.67	42.66	85.33	23.34	Charles W. King	Ward	May 1, 1898
267.00	197.81	197.82	395.63	69.18	W. J. Palmer	Thomas	May 27, 1898
45.00	68.88	45.00	f 113.88	.....	Walker & Son	do	Apr. 6, 1898
42.00	40.96	40.97	81.93	1.03	J. H. Lane	Ward	June 15, 1898
41.50	27.61	27.61	55.22	13.89	Fredk. G. Atkinson	do	May 21, 1898
20.00	9.40	9.40	18.80	10.60	George A. Green	Ward	May 24, 1898
130.00	78.95	78.95	g 157.90	.....	Arthur Keith	Lanigan ..	June 8, 1898
75.00	54.89	54.90	109.79	20.10	John H. Walter	Ward	Apr. 20, 1898
235.00	149.74	149.74	299.48	85.26	T. W. Kerr	Prince	Apr. 30, 1898
187.00	148.53	148.53	297.06	38.47	W. D. West	do	Apr. 2, 1898
105.00	95.33	95.33	190.66	9.67	Lucinda A. Brown	Ward	Dec. 8, 1897
198.00	193.22	193.22	386.44	4.78	.....	.....	.....
18.00	11.08	11.08	22.16	6.92	.....	.....	.....
4,857.00	2,154.19	2,130.37	6,284.56	488.43	.....	.....	.....

d Balance carried forward to fiscal year 1899.

e Balance carried forward to job in private roads, Cleveland Park.

f The excessive cost of this work was due to the very difficult character of the excavation.

g Awaiting bill for repairs to pavements.

COST.

Branches	Amount of deposit.	Cost to property owner.	Amount returned.	For whom done.	Overseer.	Date of completion.
2	\$262.00	\$165.17	\$96.83	Jacob Steiger	Prince	Sept. 14, 1897
.....	45.00	37.00	8.00	C. A. Langley	do	Aug. 10, 1897
6	163.00	126.15	36.85	E. J. Hannan	do	Aug. 20, 1897
2	150.00	108.25	41.75	Ellerson & Wemple	do	Feb. 25, 1898
.....	40.00	a 208.18	.....	Capital Traction Co	do	May 31, 1898
6	180.00	b 81.27	8.78	C. A. Langley	Lanigan ..	June 15, 1898
3	96.00	c 136.82	43.18	T. H. Pickford	Ward	May 19, 1898
.....	.....	e 76.87	.....	George F. Brown	do ....	.....
6	180.00	120.75	59.25	R. F. Lukei	Prince	Mar. 5, 1898
27	1,116.00	1,008.44	296.59	.....	.....	.....

a Paid out of general deposit.

b Reconstructing receiving basin.

c Awaiting bill for repairs to pavements.

TABLE 4.—*Assess*

No. of order.	Location.	Pipe sewers laid (length in feet).			
		6-inch. ^a	8-inch.	10-inch.	12-inch.
	Monroe street, between Buchanan street and Navy place.				
	Monroe street, between Navy place and Maple avenue.				
1	Thirty-fourth street NW., between Q and R.			150	51
2	Trinidad avenue NE., between Levis and King streets.			202	
3	Monroe street, between Harrison street and river.			120	118
4	D street NE., between Tenth and Eleventh (south side).				357
5	Oak street, between Linden street and Harewood avenue.			239	377
6	Pomeroy street, between Linden and Third.			99	63
7	Square 1012				189
8	North Capitol, between S and Randolph streets (east side).			127	
12	First street, between R and Randolph (east side)			113	114
13	Square 281			292	
14	Square 617				87
19	Square 1004				113
20	Square 14				260
21	Twenty-sixth street NW., between Pennsylvania avenue and M street (west side).			252	
22	First street SE., between K and L (west side)			246	
23	First street SE., between I and K (west side)				127
24	Thirty-first street NW., between Chesapeake and Ohio Canal and M street (east side).				113
25	Indiana avenue NW., between First and Second streets (north side).	21		295	
26	Seaton street NE., from Sixth street eastward (north side).				575
27	Whitney avenue, between Sherman avenue and Thirteenth street.				196
28	Twenty-second street NW., between N and O.			211	317
29	Bates street NW., between North Capitol and First.				3
34	Fourteenth street and Rhode Island avenue NW., northeast corner.			424	
35	Petworth, block 22.				3
172	Second and A, northeast corner; Third and A, northwest corner; SE.				
143	Canal street property yard.				37
118	Bennings road, between Sixteenth and Seventeenth streets.				283
154	Brightwood avenue, between Farragut and Marshall.				370
179	Breed's terrace, east of Center street.			51	
146	C street SE., between Tenth and Eleventh (south side).			294	
131	Dea Moines street, between Illinois avenue and Ninth street.				320
182	D street SE., between Fifteenth and Sixteenth				109
165	Eleventh street NE., between F and G (west side)				195
187	E street NW., between Third and Fourth (south side)			100	
169	Fifteenth street NE., between G street and Maryland avenue (west side).			92	
159	Square 564			300	
175	First street SE., between L and M (west side)				3
166	First street SW., between B and Canal				291
158	Fifteenth and G streets NE., northwest corner			171	286
132	Fourteenth street NE., between B and C (west side).				193
116	First street SW., between I and K (west side)				
150	Farragut street, between Sherman street and Brightwood avenue.			165	165
156	Fourteenth street, between K street and Georgia avenue (west side).			187	293
149	Fourteenth street, between E and G (west side)			463	
164	Flint street, between Ninth street and Illinois avenue.			309	
177	Frankfort street NE., between Twelfth and Thirteenth.				191
178	G street NE., between Eleventh and Twelfth (north side).	18			128
155	G street NE., between Eleventh and Twelfth (south side).				156
162	G street SE., between Fourteenth street and Pennsylvania avenue (south side).				
	Hartford street NE., between Twelfth and Thirteenth		315		

^a 6-inch pipe used in making lateral connections.^b All work, except repairs to pavements, accounted for in annual report for 1897, and the cost of same is included.^c Work begun in fiscal year 1897.

ment system.

Man-holes.	Basins.	Branches.	Cost to District of Columbia.	Cost to property owner.	Total cost.	Overseer.	Date of completion.
			\$8.10	\$8.09	b \$180.64	Prince	July 9, 1897
			24.98	24.98	b 573.22	do	July 10, 1897
		24	95.61	95.61	b 637.83	Lanigan	July 25, 1897
			158.05	158.06	c 316.11	Ward	July 6, 1897
2		8	130.02	130.01	260.03	do	July 9, 1897
2		8	172.06	172.06	344.12	Lanigan	Sept. 17, 1897
2		18	223.23	223.23	446.46	Ward	Aug. 14, 1897
3		65	385.00	385.00	770.00	do	Aug. 31, 1897
1		12	97.65	97.66	195.31	Lanigan	Aug. 31, 1897
1			126.82	126.82	253.64	do	Oct. 1, 1897
1		8	96.36	96.36	192.72	Ward	Sept. 1, 1897
2		19	130.85	130.85	261.70	Prince	Oct. 14, 1897
2		32	179.82	179.82	359.64	Lanigan	Sept. 11, 1897
1			68.65	68.65	137.30	Ward	Sept. 11, 1897
		10	50.31	50.31	100.62	Prince	Sept. 7, 1897
1		13	284.29	284.29	568.58	do	Oct. 25, 1897
1		15	139.57	139.57	279.14	Ward	Nov. 16, 1897
1		12	156.78	156.78	313.56	do	Nov. 16, 1897
1		5	85.69	85.69	171.38	Prince	Oct. 28, 1897
1		4	133.52	133.52	267.04	Lanigan	Sept. 28, 1897
		11	139.04	139.03	278.07	Prince	Nov. 10, 1897
3		4	392.09	392.09	784.18	Ward	Oct. 14, 1897
1		2	132.08	132.08	264.16	do	Nov. 9, 1897
3		21	298.38	298.38	596.76	Prince	Nov. 2, 1897
	1				53.57	Lanigan	Oct. 8, 1897
3		17	251.95	251.95	503.90	Ward	Oct. 20, 1897
	2				94.14	Lanigan	Oct. 19, 1897
		2	16.25	16.24	d 65.78	James Lanigan	June 6, 1898
					32.49	Prince	Dec. 13, 1897
2		8	219.22	219.21	438.43	Ward	Jan. 25, 1898
2		5	211.43	211.43	422.86	do	Mar. 8, 1898
1		3	32.39	32.39	64.78	do	May 26, 1898
1			154.24	154.25	308.49	do	Jan. 18, 1898
2		10	182.16	182.16	364.32	Prince	Jan. 5, 1898
1		2	95.88	95.89	e 191.77	Ward	Jan. 5, 1898
2		9	156.39	156.39	312.77	do	May 31, 1898
		5	65.44	65.44	f 130.88	do	
2		7	82.28	82.27	164.55	Prince	May 31, 1898
2		15	187.06	187.06	374.12	Ward	June 8, 1898
			1.14	1.15	g 2.29	Lanigan	May 12, 1898
	1				53.13	do	Apr. 25, 1898
3		9	227.17	227.17	454.34	Prince	Mar. 21, 1898
2		11	188.92	188.91	377.83	Lanigan	Jan. 11, 1898
1		14	100.29	100.29	200.58	Ward	Dec. 9, 1897
2		9	199.98	199.98	399.96	Lanigan	Feb. 25, 1898
3		12	237.57	237.57	475.14	Prince	Mar. 15, 1898
1		17	244.47	244.47	488.94	Ward	Mar. 2, 1898
1		12	234.58	234.58	469.16	Lanigan	Apr. 13, 1898
1		7	140.77	140.77	281.54	Ward	June 16, 1898
-1		4	106.65	106.66	213.31	do	June 16, 1898
1		3	93.99	93.99	187.98	Prince	Mar. 10, 1898
1		12	210.42	210.43	420.85	Lanigan	Apr. 8, 1898

d Cost of making artificial stone basin top.

e Awaiting bill for repairs to pavements.

f Work completed in fiscal year 1898.

g Adjusting basin top.

TABLE 4.—*Assess-*

No of order.	Location.	Pipe sewers laid (length in feet).			
		6-inch.	8-inch.	10-inch.	12-inch.
153	Howard University subdivision, block 21			114	
157	I street, between Sixth and Seventh (south side)			120	366
141	Kentucky avenue SE., between E and G streets			181	181
181	Kalorama avenue and Twentieth street NW., south-east corner			24	
152	Lansing street NE., between Twelfth and Thirteenth				289
145	Levis street NE., from Trinidad avenue westward				168
184	M street and New Hampshire avenue NW., north-east corner				12
183	M street and New Hampshire avenue NW., north-west corner				18
137	Meridian street, between Center and Brown			200	283
136	Meridian street, from Center eastward			200	254
185	New York avenue and Fourteenth street NW., northeast corner				15
163	Nichols avenue, between Morris road and Maple avenue				213
160	Nichols avenue, between Morris road and Franklin street				311
144	Square 184			3	
147	Ninth street NE., between Des Moines and Flint			785	
117	O street, between North Capitol and First				573
173	Pierce street, from Jefferson street southward			166	334
133	R street NW., between Florida avenue and Twenty-second street (south side)			135	
168	Square 615			75	
176	Sixth and I streets NE., southeast corner				12
161	Square 691				128
138	Square 617				105
186	Twenty-third street NW., between G and H (west side)			129	
180	Twenty-sixth street NW., between E and F				151
170	Third street SE., between M and N (east side)			20	
171	Third street SE., between K and L (east side)			46	
174	Trinidad, block 5			300	414
167	Thirteenth street and Maryland avenue NE., south-west corner				
130	Trinidad, blocks 7 and 10				582
111	Square 252			127	
139	Thirteenth street NW., between Clifton and Roanoke				99
142	Rosedale and Isherwood, block 27				262
115	do			98	
140	Twenty-third street NW., between M and N				421
148	Thirtieth street NW., between M street and Chesapeake and Ohio Canal				278
151	Thirty-second street NW., between Water and Grace				89
110	Virginia avenue SW., between Sixth and Seventh streets (north side)			342	
	Total	39	1, 087	7, 175	11, 641

ment system—Continued.

Man-holes.	Basins.	Branches.	Cost to District of Columbia.	Cost to property owner.	Total cost.	Overseer.	Date of completion.
1	.....	9	\$68.28	\$68.29	\$136.57	Prince.....	Feb. 28, 1898
3	.....	9	338.81	338.32	676.63	Ward.....	May 12, 1898
2	.....	13	197.74	197.74	395.48	Prince.....	Dec. 8, 1897
.....	1	.....	.....	.....	47.70	Lanigan.....	June 7, 1898
.....	.....	2	169.45	169.45	338.90	.....do.....	Mar. 3, 1898
1	.....	15	96.28	96.29	192.57	Prince.....	Dec. 18, 1897
.....	1	.....	26.37	26.37	a 52.74	.....	.....
.....	1	.....	29.73	29.72	a 59.45	.....	.....
3	.....	18	317.36	317.35	634.71	Ward.....	Nov. 8, 1897
2	.....	20	288.17	288.17	576.34	.....do.....	Oct. 30, 1897
.....	1	.....	28.58	28.58	a 57.16	.....do.....	.....
2	.....	6	127.04	127.03	254.07	Prince.....	June 7, 1898
2	.....	7	149.19	149.19	298.38	.....do.....	June 6, 1898
1	1	.....	.....	.....	64.73	Lanigan.....	Dec. 9, 1897
2	.....	9	882.22	882.22	1,764.44	Ward.....	Feb. 15, 1898
2	.....	6	355.42	355.43	710.85	Thomas.....	Nov. 8, 1897
3	.....	22	433.02	433.02	866.04	Ward.....	June 12, 1898
1	.....	6	80.10	80.10	160.20	Condon.....	Nov. 4, 1897
1	.....	6	69.80	69.80	139.60	Prince.....	May 23, 1898
.....	1	.....	.....	.....	55.31	Lanigan.....	May 16, 1898
1	.....	1	84.00	84.00	168.00	Prince.....	Apr. 22, 1898
1	.....	.....	69.47	69.46	138.93	.....do.....	Nov. 20, 1897
1	.....	9	80.79	80.79	a 161.58	Lanigan.....	.....
1	.....	11	151.24	151.25	a 302.49	Prince.....	.....
.....	.....	1	12.80	12.81	25.61	.....do.....	June 6, 1898
.....	.....	2	24.44	24.45	48.89	.....do.....	June 4, 1898
4	.....	27	441.28	441.29	882.57	Ward.....	May 14, 1898
.....	1	.....	.....	.....	44.39	Lanigan.....	Apr. 23, 1898
5	.....	15	531.41	531.42	1,062.83	Prince.....	Jan. 24, 1898
1	.....	11	109.97	109.97	219.94	.....do.....	Feb. 26, 1898
1	.....	.....	67.34	67.35	134.69	Ward.....	Dec. 2, 1897
2	.....	2	128.07	128.07	256.14	Prince.....	Dec. 18, 1897
2	.....	13	79.69	79.70	159.39	.....do.....	Dec. 18, 1897
2	.....	5	306.10	306.10	612.20	Lanigan.....	Dec. 10, 1897
2	.....	13	190.46	190.46	380.92	Prince.....	Apr. 4, 1898
1	.....	4	95.84	95.84	191.68	.....do.....	Apr. 4, 1898
2	.....	15	178.36	178.36	356.72	.....do.....	Mar. 15, 1898
120	11	761	13,557.90	13,557.98	28,728.95	.....	.....

a Awaiting bill for repairs to pavement.

TABLE 5.—Work done by day labor under various
REPLACING

No. of order.	Location.	Pipe sewers laid (length in feet).						
		6-inch.	10-inch.	12-inch.	15-inch.	18-inch.	21-inch.	24-inch.
1	Sixth street SW., between F and G (west side) c.			265				
2	Sixth street SW., between F and G (east side) ..	63	118	190				
3	F street SW., between Four-and-a-half and Sixth (south side)	60	219		215			
4	Eleventh street SE., between B street and North Carolina avenue (east side)	36		78	148			
5	B street NE., between Sixth and Seventh							319
6	do.	75		18			299	
7	Sixth street SW., between School street and Virginia avenue (east side)			6		367		
11	Fourth street NE., between A and B	15		9		335		
418	A street SE., between Third and Fourth (north side)	3	125	173				
419	B street SE., between First and Second (south side)			322				
413	E street SW., between Four-and-a-half and Sixth (north side)			101				
417	Eleventh and E streets SW., northeast corner ..		12	18				
416	Eleventh street SW., between D and F	12		169	199			
424	E street, crossing Sixth street SW. (south side) ..				54			
408	Four-and-a-half, between School and Virginia avenue, Virginia avenue, between Four-and-a-half and Sixth SW			67		156		
420	G street NW., between North Capitol and First (south side)	12			144			
427	L street NW., between Twenty-sixth street and Pennsylvania avenue (south side)	6					369	
423	New Jersey avenue NW., between B and C streets (east side)	45		399				
430	Pennsylvania avenue NW., between Twenty-fourth and Twenty-fifth streets (south side) ..	39		332		63		
435	1110 Sixteenth street NW., in front of							
421	Sixteenth street NW., between L and M	18			87	324		
428	Thirteen-and-a-half street NW., between C street and Ohio avenue (east side)					150		
429	Thirteen-and-a-half street NW., between C and D (east side)	9			307			
422	Square 212	3		167				
434	Twenty-first street NW., between Q street and Massachusetts avenue (east side)					78		
432	Thirteen-and-a-half street NW., between D and E (east side)	15		201	51			
426	Twenty-sixth street NW., between K and L (east side)	3						408
425	Thirteen-and-a-half street NW., between B street and Ohio avenue (east side)				390			
412	Tenth street NW., between M and N (west side)	36		395	146			
414	T street NW., between Le Droit and Harewood avenues	48			340			
415	Twentieth street NW., between E and F (west side)			227		48		
433	Third street NW., between P and Q (west side) ..	81	157	269				
	Four-and-a-half street SW., between C and D (east side)							
	Second and M streets SE., intersection of							
	N street NW., between Twenty-second and Twenty-third							
	G street SW., between Sixth and Seventh (south side)							
	G street SW., between Sixth and Seventh (crossing)							
	Tenth street NW., crossing T street (east side) ..							
	Square 364							
	Total	579	631	3,406	2,081	1,521	668	727

a Six-inch pipe used in making lateral connections.

b The net cost of sewer is determined by deducting the cost of repairs to pavements plus cost of connections from the total cost.

c Work begun in fiscal year 1897.

d Includes \$4.65, cost of repairing service pipe.

e Includes \$15.73, cost of remodeling receiving basin.

f Includes \$5.45, cost of reconnecting 139 B street SE. with sewer.

g Cost of remodeling basin.

sewer appropriations, fiscal year 1898.

OBSTRUCTED SEWERS.

House connections made.	Total relaid.	Manholes.	Basins.	Branches.	Cost of materials.	Cost of labor.	Cost of repairs to pavements.	Total cost.	Cost of connections.	Net cost of sewer.
6	293	13	.....	11	\$79.54	\$339.49	\$14.15	\$433.18	\$41.13	\$377.90
16	319	13	.....	16	96.96	445.77	31.38	574.11	40.89	501.84
21	455	3	.....	22	157.90	661.62	d 60.33	879.85	40.37	779.15
19	507	13	.....	14	123.41	576.35	52.30	752.06	25.40	674.36
319	1	.....	11	236.71	493.42	48.25	778.38			730.13
14	299	1	.....	7	189.81	476.99	36.90	703.70	e 40.97	625.83
2	376	2	.....	2	182.30	557.26	12.84	752.40		739.56
12	346	1	.....	13	156.35	449.54	50.20	656.09	44.40	561.49
.....	300	.....	.....	11	66.60	263.52		330.12		330.12
9	325	1	.....	11	89.06	472.82	f 64.69	626.57	16.77	545.11
.....	106	.....	.....	1	22.55	126.75	65.82	215.12		149.30
30	.....	.....	.....	.....	6.33	28.11	1.89	36.33		34.44
346	1	.....	10	100.85	431.45	12.66	544.96			532.30
54	1	.....	.....	.....	30.87	63.89	16.97	111.73		94.76
.....	231	1	.....	8	91.72	364.98	49.89	506.59	g 12.22	444.48
.....	145	2	.....	6	72.76	245.87	22.49	341.12		318.63
.....	374	2	.....	9	227.63	520.16	41.17	788.96		747.79
15	459	1	.....	16	121.47	792.69	h 34.32	948.48	32.71	881.45
.....	393	2	.....	7	135.40	447.25	i 120.19	702.84		582.65
8	422	1	.....	9	174.62	878.97	k 64.78	1,118.37	12.43	1,041.07
1	150	1	.....	.....	68.50	236.88	15.43	320.81		305.38
9	320	2	.....	13	123.46	475.42	l 44.82	643.70	20.66	578.22
.....	168	.....	.....	4	38.46	225.67	112.46	376.59		264.13
.....	78	1	.....	.....	55.33	586.34		m, n 641.67		641.67
4	263	2	.....	6	81.13	92.78	49.02	222.93		173.91
.....	405	2	.....	9	310.68	506.23	38.16	855.07		816.91
2	390	.....	.....	.....	239.01	829.08		n 1,068.09		1,068.09
25	517.4	1	1	27	170.30	626.25	121.97	918.52	71.37	725.18
9	350.7	2	.....	8	136.84	518.55	166.64	822.03	15.37	640.02
9	273.5	1	.....	13	102.94	372.92	33.42	509.28	10.90	464.96
42	448	4	.....	46	157.39	831.79		o 989.18		989.18
.....	.....	.....	.....	.....	.....	.....	18.38	o 755.50		737.12
.....	.....	.....	.....	.....	.....	.....	32.61	o 458.11		425.50
.....	.....	.....	.....	.....	.....	.....	5.29	o 76.57		71.28
.....	.....	.....	.....	.....	.....	.....	332.76	o 1,438.27		1,105.51
.....	.....	.....	.....	.....	.....	.....	13.65	o 993.84		980.19
.....	.....	.....	.....	.....	.....	.....	47.19	o 459.52		412.33
.....	.....	.....	.....	.....	.....	.....	14.16	o 167.19		153.03
.....	.....	.....	.....	.....	.....	.....	160.49	o 1,456.39		1,295.90
223	9,462.6	42	1	310	3,846.88	13,938.81	2,007.67	24,983.13	425.59	22,602.88

A Includes \$3.80, cost of reconnecting 205 New Jersey avenue with sewer.

i Cost of reconnecting laterals by plumber (\$67.09) included.

j Repairing water-service pipe broken by settlement of sewer trench.

k Includes \$1.37, cost of repairing service pipe.

l Includes \$9.37, cost of reconnecting laterals by plumber.

m A waiting bill for repairs to pavements.

n The excessive cost of this work is due to the exceptionally difficult character of the excavation.

o All this work, except repairs to pavements, accounted for in annual report of 1897, and the cost of same is included.

TABLE 6.—Main

No. of order.	Location.	Pipe sewers laid (length in feet).				
		6-inch. ^a	8-inch.	10-inch.	12-inch.	15-inch.
	N street SW., between Third and Four-and-a-half.					
	Maryland avenue SW., between Ninth and Tenth.					
	Twentieth street NW., between G and H (west side)					
	Twentieth street NW., between H street and Pennsylvania avenue (west side)					
	Tenth street SW., between C and D (west side)					
	Twenty-first street NW., between H and I (east side)					
	Twenty-first street NW., between H and I (west side)					
	Twenty-first street NW., between F and G (east side)					
	Thirty-fourth street NW., between N and O (east side)					
	Twenty-first street NW., between F and G (west side)					
	Twentieth street NW., between H street and Pennsylvania avenue (east side)					
	Thirty-fifth street NW., between N and O (east side), and south side N street, crossing Thirty-fifth street					
	G street NE., between Third and Fourth (south side)					
	Thirty-fifth street NW., between T and U (crossing)					
1	Square 403				156	
2	I street NW., between Twenty-fourth and Twenty-fifth (north side)	27			333	
3	I street NW., between Twenty-fourth and Twenty-fifth (south side)	27			333	
4	I street NW., between Twenty-fifth street and New Hampshire avenue (north side)	18			282	
5	Twenty-third street NW., between H and I (east side)					
6	Fourteenth and A streets SE., southeast corner				33	
7	Square 1004			6		
8	First street and New York avenue NE., southwest corner				3	
9	I street NW., between Twenty-third and Twenty-fourth	42			257	
10	Twenty-third street NW., crossing H street (east side)					84
11	H street NW., between Twenty-second and Twenty-third (north side)	45			282	
12	I street NW., between Twenty-third and Twenty-fourth (south side)	15			275	
13	H street NW., between Twenty-second and Twenty-third (south side)	39			319	
14	Florida and Delaware avenues NE., southeast corner				33	
15	Fourth street and Florida avenue NE., southeast corner				48	
16	Third street and Florida avenue NE., southeast corner				72	
17	Fourteenth street, between M and N (west side)	18			282	
18	Fourth and K streets NE., northwest corner					
19	Sixth and Morris streets NE., southeast corner				9	
20	Seventh and Morris streets NE., southwest corner				39	
21	Eighth and F streets NE.				15	
22	Fourth street NE., between A and B (west side)				132	
23	E street SE., between Fifteenth street and Kentucky avenue (north side)					198
24	Fifteenth and E streets; Kentucky avenue and E street, northwest corners			87		
25	Square 236	6		6	313	
26	Square 995				426	
27	G street SE., between Eleventh and Twelfth				42	
28	Fifteenth street and Massachusetts avenue SE., northwest corner			27		
29	Thirteenth and B streets SE., northeast corner			27		
30	Square 554			108		

^a Six-inch pipe used in making lateral connections.^b All work except repairs to pavements accounted for in annual report for fiscal year 1897, and the cost of same is included.^c Includes \$2 10, cost of repairing service pipe.^d Includes \$15.55, cost of lateral connections.

and pipe sewers.

Pipe sewers laid (length in feet).			2-foot diameter, brick.	Man- holes.	Basins.	Branches.	Cost of mate- rials.	Cost of labor.	Cost of repairs to pave- ments.	Total cost.
18- inch.	21- inch.	24- inch.								
			<i>Lin. ft.</i>							
									\$4.78	b \$42.39
									31.30	b 437.96
									6.42	b 523.58
									4.19	b 510.89
									8.10	b 81.05
									19.19	b 751.03
									9.88	b 472.73
									35.80	b 690.92
									16.48	b 662.62
									31.30	b 884.71
									5.19	b 366.88
									32.68	b 801.26
									10.30	b 285.34
									19.12	b 102.26
					1		\$60.33	\$124.47	56.61	301.41
21		51		3		12	168.27	388.36	c 37.21	598.84
3	15			3		9	130.57	304.83	31.64	467.04
	36			3		18	138.82	371.32	32.60	542.74
	362			2		13	234.73	508.37	d 66.21	809.31
					1		22.86	41.91		64.77
					1		15.61	20.50		36.11
					1		21.28	37.54		58.82
36				2		13	108.65	290.73	e 45.43	444.81
				2			52.69	135.86	11.41	199.96
				2		18	107.08	303.97	f 35.70	446.75
	15			2		13	104.22	232.02	g 15.59	351.83
				1		11	100.16	323.54	35.96	459.66
					1		27.73	36.18		63.91
					1		31.41	45.75		77.16
					1		34.39	43.25		77.64
				2		9	103.54	299.80	h 80.88	484.22
					1		20.38	25.12	7.62	53.12
					1		22.51	25.93		48.44
					1		28.34	34.29		62.63
					1		23.23	24.50		47.73
				1			45.52	116.88	17.56	179.96
				1			75.81	272.22		348.03
					2		52.58	125.42		178.00
				2	1	8	115.06	261.75	47.25	424.06
				3		24	152.53	588.71	184.02	925.26
							11.58	55.60	.84	68.02
					1		25.15	25.27		50.42
					1		25.69	29.92		55.61
					1		33.09	75.13		108.22

e Includes \$32.15, cost of reconnections.

f Includes 45 cents, cost of connecting water pipe.

g Includes \$4.18, cost of connecting service pipe.

h Includes \$46.10, cost of lateral connections.

TABLE 6.—Main and

No. of order.	Location.	Pipe sewers laid (length in feet).				
		6-inch.	8-inch.	10-inch.	12-inch.	15-inch.
31	North Capitol and Hanover streets, northeast corner				12	
32	Square 897				132	
33	H street NW., between Ninth and Tenth (north side)	12				
34	Square 374	24		6	125	3
35	Twelfth street, north of M street NE. (west side)			48		
36	Twelfth street, north of N street NE. (east side)				21	
37	Twelfth street, north of N street NE. (west side)				48	
38	Twelfth street, north of O street NE. (west side)				42	
39	Twelfth street, north of O street NE. (east side)				21	
40	Twelfth street, north of M street NE. (east side)			24		
41	Florida avenue NE., between Fifth and Sixth streets					39
42	Brentwood road, between Florida and New York avenues				30	
43	Trinidad avenue, between Levis and Turner streets				63	
44	Square 281	12			3	221
47	Intersection of Sherman avenue with Marshall and Steuben streets				45	
48	B street NE., between Fifth and Sixth	51			18	
49	G street NE., between Eighth and Ninth					21
50	Thirteenth street and Kenesaw avenue, northwest corner				27	
51	Florida avenue and Bohrer street NW., northwest corner			12		
52	Third street and Pennsylvania avenue SE., northwest corner				3	
53	Third street and Pennsylvania avenue SE., northeast corner				3	
54	Fourth street and Pennsylvania avenue SE., northeast corner					18
55	C street and Pennsylvania avenue SE				6	
57	Sherman avenue, south of Irving street (west side)				60	
58	Sherman avenue, south of Irving street (east side)				24	
59	Sherman avenue, north of Irving street (west side)				57	
60	Sheridan circle (east side)				90	
62	Sixth street SW., between C street and Maryland avenue (west side)					108
63	Sixth street NE., between H and I					42
64	L street NW., between First street and New Jersey avenue					120
65	Florida and Champlain avenues					
66	Seventeenth and V streets; Seventeenth and Seaton streets, northwest corners				60	
67	New Jersey avenue and R street NW., northeast corner				30	
68	Square 621	18				67
69	Ninth street, near north curb line N street SE. (west side)				24	
78	Bates street NW., between North Capitol and First				111	
83	N and Union streets SW., northeast corner				12	
85	Sixth and N streets SW., northeast corner				9	
629	A street SE., between Second and Third (south side)			129	192	
617	Canal street, property yard					
607	B street, about west curb line Seventh street SW. (north side)				27	
639	C street SE., between Tenth and Eleventh (south side)			12		
605	Clifton street NW., between Thirteenth and Fourteenth (north side)			3		
631	D street NW., between Fifth and Sixth (north side)					216
611	D street SW., between Seventh and Eighth	3				
596	D street SE., between South Capitol street and New Jersey avenue				372	
579	D street SE., between Sixteenth and Seventeenth					
634	E street SW., between Six-and-a-half and Seventh			25		
590	Eleventh and C streets NW., northwest corner					
603	Eighth street NW., between D and E (east side)				148	
628	Fourth and L streets SE., southwest corner					24
637	Fourth and L streets SE., northwest corner				3	
612	Fourteenth and I streets SE., intersection					

a Includes \$5.38, cost of repairing water pipes.

b Includes \$1.22, cost of repairing water pipes.

c Includes \$1.50, cost of repairing water pipes.

pipe sewers—Continued.

Pipe sewers laid (length in feet).			3-foot diameter brick.	Man- holes.	Basins.	Branches.	Cost of materi- als.	Cost of labor.	Cost of repairs to pave- ments.	Total cost.
18- inch.	21- inch.	24- inch.								
			<i>Lin. ft.</i>							
					1		\$22.87	\$27.71	\$7.64	\$58.23
				3			76.72	169.25		245.97
259		36		3		11	152.76	327.68	a 60.22	540.66
154				2	3	15	128.55	348.41	99.80	576.76
					1		29.28	45.39		74.67
					1		26.11	29.72		55.83
					1		31.62	47.57		79.19
					1		31.13	45.95		77.08
					1		25.65	26.74		52.39
					1		25.59	28.52		54.11
45		33			3		110.34	135.26		245.60
					2		48.45	46.01		94.46
					3		48.48	79.72		128.20
3				3	1	4	125.30	235.49	106.58	467.37
					2		50.97	61.05		112.02
	352			3		8	232.33	491.98	b 63.84	788.15
				1			12.81	41.13	8.81	62.75
					1		18.92	33.66		52.58
					1		22.62	25.33		47.95
				1	1		36.30	38.35	29.57	104.22
				1			17.75	22.95		40.70
							10.54	21.45	10.30	42.29
36				1	2		63.19	96.92	c 11.25	171.36
					1		32.27	36.60		68.87
					1		26.47	23.01		49.48
					1		33.15	50.45		83.60
					2		61.39	70.17	7.85	139.41
75							60.72	260.78	19.82	341.32
				1			26.18	46.89		73.07
				1			50.08	134.71	12.68	197.47
6					1		21.88	34.60		56.48
					2		49.47	73.55		123.02
					1		26.77	38.42		65.19
179				1	1	12	132.11	523.32	116.83	772.26
					1		24.89	36.67		61.56
					1		41.09	104.95		146.04
					1		23.18	27.05		50.23
					1		21.43	28.67		50.10
				2		15	106.10	324.52	d 1.95	432.57
							48.00	51.36		e 99.45
					1		25.77	45.46	8.43	79.66
							2.24	13.34	f 2.00	17.58
					1		13.87	25.40		39.27
				1		6	84.82	207.87	23.90	316.59
227				2		7	118.42	335.06	25.21	478.69
				3		27	158.71	419.23	g 224.67	802.61
	396			1			218.29	471.19		689.48
				1		2	19.71	29.37		49.08
					1		20.38	25.37		45.75
				1		2	61.38	165.97	15.32	242.67
							7.32	37.82	2.76	47.90
					1		20.74	27.19		47.93
		15		1			31.28	33.30		64.58

d Cost of repairing water pipe.

e Cost of making artificial stone basin tops.

f Cost of repairing water-service pipe.

g Includes \$3.90 cost of repairing service pipes.

TABLE 6.—Main and

No. of order.	Location.	Pipe sewers laid (length in feet).				
		6-inch.	8-inch.	10-inch.	12-inch.	15-inch.
582	F street and Tennessee avenue NE., southwest corner					
581	Fifteenth and Gales streets NE., southeast corner				45	
614	Fourteenth and W streets NW. and northeast corners east side of Fourteenth north of W.				50	60
640	G street NE., between Tenth and Eleventh					255
638	G street NE., between Eleventh and Twelfth				135	
615	G street SE., between Fourteenth street and Pennsylvania avenue				18	
588	K street NE., near east side of North Capitol					48
623	M street SE., crossing First					42
599	M street NW., crossing Thirtieth				9	
600	Potomac and N streets NW., southeast corner			9		
626	Massachusetts and South Carolina avenues SE.			84		
556	O street NE., between North Capitol and First					53
602	Square 167		57			
595	North Capitol and Q streets				3	
625	Fifth street and Pennsylvania avenue SE., southeast corner				111	3
606	Pennsylvania avenue NW., between Nineteenth and Twentieth streets			118	116	
584	Pennsylvania avenue SE., between Second and B streets				3	117
561	P street, between Kingman place and Iowa circle, and Iowa circle, between P and Thirteenth streets		21	263	116	
592	Seventh street SE., between Pennsylvania and South Carolina avenues					
587	Sherman avenue, near south line of Whitney avenue				18	
574	Second, B, and Canal streets SW.				27	
609	Seventh street SW., between C and D				12	
641	Square 250				18	
630	Square 212		37			
636	Third street SE., between K and L			30		
621	Twenty-seventh and Olive streets NW., northwest corner				18	
619	Twenty-seventh street and Dumbarton avenue NW., northwest corner				18	
620	Twenty-seventh and N streets NW., northwest corner				24	
622	Twenty-seventh and M streets NW., northeast corner				21	
598	Twenty-fifth and I streets NW., northwest corner				12	
616	Thirteenth street, between G and H				86	63
589	Twelfth and C streets NW.				21	
593	Third street SW., between I and K (west side)				60	
591	Third street SW., between K and L (west side)				235	
633	Twenty-sixth and D streets NW., northeast corner				33	
635	Third and Van streets SW., northwest corner			15		
594	Third street, between L and M					
586	Twenty-second street NW., between M and N					18
545	Square 252			49	253	3
597	Square 378	12		31		
610	Square 252			102		
608	Twenty-first street NW., between C and Water					
613	Thirty-second street NW., between Water and Grace				57	
627	Square 691				103	
618	Six-and-a-half and D streets SW., southwest corner				18	
546	Sixth street SW., between C street and Virginia avenue (west side)			18	45	
604	Sixteenth street and Kenesaw avenue NW., northeast corner				15	
601	Sixth street SE., between Pennsylvania and North Carolina avenues (east side)				54	210
573	Sixth street NW., between E and F (east side)				355	
572	Sixth street NW., between D and E (east side)					480
571	Sixth street NW., between E and F (west side)				375	
570	Sixth street NW., between D and E (west side)					479
632	Southwest corner Spruce and Linden streets; northwest corner Harewood avenue and Spruce street				72	
Total		369	115	1,239	8,058	2,992

a Awaiting bill for repairs to pavements.

b Includes \$4.45, cost of repairing service pipes.

pipe sewers—Continued.

Pipe sewers laid length in feet).			3-foot diameter, brick.	Man- holes.	Basins.	Branches.	Cost of mate- rials.	Cost of labor.	Cost of repairs to pave- ments.	Total cost.
18- inch.	21- inch.	24- inch.								
			<i>Lin. ft.</i>							
					1		\$19.84	\$18.25		\$38.09
					1		28.95	40.88	\$7.62	77.45
				1	2		86.08	185.66	78.73	350.47
	27			2		3	125.98	314.32		a 440.30
				2			60.71	142.40	13.22	216.33
				1			20.03	23.47		43.50
	36			1	2		85.45	131.27	64.55	281.27
				1			29.18	64.56	2.64	96.38
15		9	41.5	1			97.61	338.20	66.20	502.01
				1	1		21.15	27.39		48.54
				1	1		34.78	59.68		94.46
				1	1	1	31.36	81.45		112.81
				1	1		22.55	33.05		55.60
				1	1		19.82	22.70	2.13	44.65
				2	1		68.66	108.56	14.95	192.17
				3		12	103.40	349.10	34.21	486.71
				1	1	3	72.08	148.75	b 34.29	255.12
				3		11	130.07	406.95	151.69	688.71
426				3			215.28	425.24	106.91	747.43
				1	1		42.14	56.02		98.16
57		203		4		1	204.46	447.89	50.56	702.91
		237		1		9	189.30	557.35	105.03	851.68
				1	1		23.66	20.96		c 44.62
				1	1	4	25.01	83.15	20.33	128.49
				1	1		18.78	26.43	3.60	48.81
					1		24.59	26.63		51.22
				1	1		24.20	28.94		53.14
				1	1		24.30	31.28		55.58
				1	1		24.72	24.01	6.81	55.54
				1	1		22.95	31.10		54.05
				1	1	1	58.08	218.38	27.91	304.37
				2	1		25.00	29.91		54.91
	268			2	7		185.43	403.50	46.77	635.70
27		15		2	13		115.37	386.10	31.52	532.99
					1		27.40	46.43		73.83
					1		22.91	28.60		51.51
30		332		1	8		256.93	517.98	33.98	808.89
27		143		1	1		136.94	326.65	e 57.38	520.97
				3	2	13	164.06	347.35	145.16	656.57
						4	9.31	20.56	6.75	36.62
				1	6		37.08	108.10	18.90	164.08
245				1	1		112.54	349.85		462.39
				1			21.85	55.79	6.91	84.55
				1	1	2	38.39	77.68		116.07
					1		24.95	39.31		64.26
				1			28.75	66.85	14.14	109.74
					1		24.27	32.75		57.02
				3			116.40	398.24	59.11	573.75
				2	14		126.30	374.24	38.82	539.36
30				4	18		236.78	582.32	d 36.91	856.01
				2	9		123.74	379.97	46.50	550.21
39				4	13		241.28	625.15	23.28	889.71
					2		55.51	87.00		142.51
1,913	1,536	1,074	41.5	122	90	412	9,096.65	21,116.02	3,158.20	39,899.76

c Includes \$5.11, cost of connecting No. 1236 Twenty-second street with sewer.
d Includes \$17.35, cost of repairing laterals and service pipes.

TABLE 7.—*Suburban*

No. of order.	Location.	Pipe sewers laid (length in feet).				
		6-inch. ^a	8-inch.	10-inch.	12-inch.	15-inch.
1	Champlain avenue, between Superior and Erie streets					
2	Richmond street, between Brightwood avenue and Ninth street				144	
3	Ninth street, between Richmond and Savannah				866	
4	Savannah street, between Eighth and Ninth			242		
5	First street N W., between V and W				283	
6	Columbia road, between Wyoming avenue and Nineteenth street					
7	Columbia road, between Kalorama avenue and Nineteenth street					
8	North Capitol, between R and Randolph streets (east side)				27	105
9	First street, between R and Randolph crossing					
10	Lansing street, from Twelfth eastward	6				839
16	Massachusetts avenue, between Twenty-second street and Sheridan circle					
17	Sixth street N E., between Seaton and T	3			3	221
18	Hampton place, between Rock Creek and Twentieth street		39			
821	Brightwood avenue at Howard avenue crossing				57	
830	Burleigh, block 138					
829	Columbia road, from Kalorama avenue northward					
824	Dover street N E., between Twelfth and Thirteenth					646
822	Dover street N E., between Tenth and Twelfth					
823	Fourteenth street road bridge					
815	Farragut street, between Sherman and Brightwood avenues					194
814	do					
834	Jefferson street, between Polk and Pierce					
827	Jackson street, between Fillmore and Pierce			168	318	
835	Kenesaw avenue N W., between Fifteenth and Sixteenth streets				27	
811	Marshall street, between Brightwood and Sherman avenue					
812	do					
813	do					259
820	Pierce street, between Washington and Jefferson				116	
819	Rock Creek Church road, between Spring road and Eighth street				266	
831	Trinidad avenue, between M and O streets					165
828	Twenty-second street, between R and Decatur				120	
826	Thirteenth street, between Frankfort and Hartford				852	
825	Thirteenth street, between Dover and Frankfort				854	
Total		9	39	410	2,433	1,929

^a Six-inch pipe used in making lateral connections.

s sewers.

Pipe sewers laid (length in feet).			24-inch cast-iron pipe.	3.75 by 5.625 feet brick.	Man-holes.	Branches.	Cost of materials.	Cost of labor.	Cost of repairs to pavements.	Total cost.
18-inch.	21-inch.	24-inch.								
	137		<i>Lin. ft.</i>	<i>Lin. ft.</i>	1	4	\$90.49	\$198.50		\$288.99
					1		49.03	151.27		200.30
					2		117.02	324.32		441.34
					1	4	64.27	189.22		253.49
					2	5	97.11	272.65		369.74
		281			1	1	208.41	429.32		637.73
	267				1		156.47	391.36		547.83
					1		48.24	123.88	\$11.19	183.31
					1		23.87	43.82	7.70	74.89
					1	3	162.58	617.95		790.53
		258			1		189.42	416.89	30.86	637.17
	48				2	1	119.30	246.73	22.50	388.53
					1		27.52	65.45		92.97
					1		23.43	99.75	11.85	135.03
		3		76.1	1		191.64	434.85		626.49
144					1		62.57	202.91	6.24	271.72
					3	8	195.00	673.33		868.33
		176			1	1	140.34	449.10		589.44
		45	36		1		262.94	358.03		620.97
					1	1	71.72	176.55		248.27
364					2	5	171.75	400.46		572.21
146					1	4	76.49	253.42		329.91
					4	18	177.90	381.72	c35.70	595.32
							6.32	25.42		31.74
	257				1	1	152.15	364.60		516.75
					1	8	134.42	333.70		468.12
289					1	8	99.24	374.01		473.25
					1	1	46.13	163.14		209.27
					3	7	103.56	255.28		358.84
375					3		250.35	639.04		889.39
					1		44.53	103.06		147.59
					2	8	107.50	300.79		408.29
					2		98.61	215.20		313.81
1,318	709	763	36	76.1	46	88	3,769.82	9,675.70	126.04	13,571.59

b Includes cost of wrought-iron beams and other iron work necessary for supports for the cast-iron pipe.

c Cost of lateral connections.

TABLE 8.—Miscellaneous appropriations in

No. of order.	Location.	Pipe sewers laid (length in feet.)		
		8-inch.	10-inch.	12-inch.
2	Columbia road, between Florida avenue and Eighteenth street.		186	
3	Columbia road, between Eighteenth street and Wyoming avenue.		90	
4	Columbia road and California avenue, northwest corner		6	
1	Seventeenth street NW., between D and E.		9	18
20	Eighth and M streets SE.		39	60
21	New York avenue and Eleventh street NW., southeast corner.			21
1039	Fourteenth street and Thomas circle, northwest corner			6
1050	Four-and-a-half street and Missouri avenue NW., northeast and northwest corners.			21
1033	Pennsylvania avenue NW., between Eighteenth and Twentieth streets.			60
1034	Second street SE., between East Capitol and A.			21
1045	Seventeenth and Madison streets NW., northwest corner	6		
1048	Seventeenth and Q streets NW., southeast corner			12
5	F street NE., between Fifth and Seventh.			6
6	Tenth street NE., between East Capitol and B.			
8	Florida avenue NE., between Third and Fourth streets			
14	Florida avenue NE., east of Fifth street (north side)			
1049	Fourth and K streets NE., northwest corner.			
7	Twelfth street and Florida avenue NE.			6
15	Twelfth street, north of M street NE.			
9	Sherman avenue, between Grant and Steuben streets			6
10	Sherman and Sheridan avenues, northeast corner			21
11	Twentieth and H streets NW., northeast and southeast corners.		15	
17	New Jersey and Rhode Island avenues NW., northeast corner.			3
1029	Eleventh and B streets NW., northwest and northeast corners.			6
1027	Eleventh and C streets NW., northeast corner.			42
1028	Twelfth and C streets NW., northwest corner.			
1032	Twenty-sixth and I streets NW.			3
1031	Twenty-fifth street NW., between H and K.			42
1042	Tenth and E streets NW., northwest and northeast corners			42
1044	Tenth street, west side, near north side of D.			30
12	Fourteenth and E streets SE., northwest and southwest corners.			
19	Ninth street SE., between Pennsylvania and South Carolina avenues.			30
1038	Fourth street SE., between E and G.			9
1041	South Capitol street, between H and K.			
13	M street NW., between Thirty-second and Thirty-third (north side).			9
16	M street NW., between Thirty-second and Thirty-third (south side).			3
1035	M street NW., between Thirty-second and Thirty-third (south side).		30	
1036	M street NW., at Potomac street (south side)		39	
1043	Twenty-seventh and O streets NW., northeast corner			9
18	Third street SW., between I and K.			24
22	Virginia avenue SW., between South Capitol street and Delaware avenue.		3	
23	Delaware and Virginia avenues SW., northeast corner.			36
24	Sixth and N streets SW., southeast corner.			12
1025	Four-and-a-half street SW., north of N street (west side)			3
1026	Four-and-a-half street SW., south of N street (west side)			3
1040	Kenesaw avenue and Park road.			
1051	Louisiana avenue, north side, west of Ninth street NW.			6
1030	North Capitol street and Florida avenue, northeast corner.			24
1047	Twenty-second and H streets NW., southwest corner.			
1046	Twenty-second and H streets NW., southeast corner			
	Total	6	417	594

a Includes \$22.77, cost of repairs to pavements.

b Basins reconstructed.

c Adjusting basins.

OPERATIONS OF THE ENGINEER DEPARTMENT, D. C. 111

fiscal year 1898; work performed by day labor.

Man-holes.	Basins.	Cost of materials.	Cost of labor.	Cost of contingencies.	Total cost.	Appropriation.
	5	\$135.30	\$182.83	\$15.91	\$334.04	Paving Connecticut avenue and Columbia road, 1898.
	2	68.62	151.43	a 34.91	254.96	Do.
	1	21.69	25.45	2.36	49.50	Do.
	3	69.11	130.31	9.97	209.39	Repairs to concrete pavements, 1898.
1	3	86.75	141.55	11.42	239.72	Do.
	1	24.84	31.30	2.81	58.95	Do.
	1	33.12	26.43	2.98	62.53	Do.
	2	44.53	64.67	5.46	114.66	Do.
	4	91.54	101.90	9.67	203.11	Do.
	1	28.40	44.25	3.63	76.28	Do.
	1	21.03	28.15	2.46	51.64	Do.
	1	17.08	29.30	2.32	48.70	Do.
	b 3	60.93	65.84	6.34	133.11	Improvements and repairs, northeast section, 1898.
	b 5	101.33	113.32	10.73	225.38	Do.
		3.13	6.56	.48	c 10.17	Do.
			2.38	.12	d 2.50	Do.
		2.21	7.66	.49	e 10.36	Do.
	b 2	26.28	46.08	3.62	75.98	Improvement, Twelfth street NE., 1898.
		37.40	92.58	6.50	e 136.48	Do.
	b 1	17.76	25.58	2.17	45.51	Improvement of Sherman avenue, 1898.
	1	25.11	27.88	2.65	55.64	Do.
	b 2	44.06	55.06	4.96	104.08	Improvements and repairs, northwest section, 1898.
	b 1	20.74	23.47	2.21	46.42	Do.
	2	41.14	56.97	4.91	103.02	Do.
	1	28.44	44.99	3.67	77.10	Do.
	1	20.38	31.36	2.59	54.33	Do.
	2	40.14	43.75	4.19	88.08	Do.
	4	89.03	98.61	9.38	197.02	Do.
	2	49.85	40.20	4.50	94.55	Do.
	1	26.05	49.29	3.77	79.11	Do.
		1.55	8.30	.49	e 10.34	Improvements and repairs, southeast section, 1898.
	2	45.68	61.35	5.35	112.38	Do.
	3	71.19	75.25	7.32	153.76	Do.
	3	60.22	72.03	6.61	138.86	Do.
	3	61.94	67.20	6.46	135.60	Improvements and repairs, Georgetown, 1898.
		36.05	73.44	5.47	b 114.96	Do.
	1	25.33	39.33	3.23	67.89	Do.
	1	53.16	92.98	7.31	153.45	Do.
	1	16.38	63.58	4.00	83.96	Do.
	2	53.08	67.49	6.03	126.60	Improvements and repairs, southwest section, 1898.
	1	17.07	17.85	1.75	36.67	Do.
	1	26.87	39.01	3.29	69.17	Do.
	1	21.94	32.91	2.74	57.59	Do.
	1	20.51	34.11	2.73	57.35	Do.
	1	20.51	29.70	2.51	52.72	Do.
		9.50	9.50	.95	f 19.95	Improvement Kenesaw avenue and Park road, 1898.
	1	20.74	24.18	2.25	47.17	Repairing sidewalks and curbs around public reservations, 1898.
	1	24.23	32.65	2.84	59.72	Paving North Capitol street between O and P streets, 1898.
	1	20.15	26.01	2.31	48.47	H street NW., between Twenty-second and Twenty-third streets, 1898.
	1	21.77	39.95	3.09	64.81	Do.
2	78	1,003.86	2,695.97	253.91	4,853.74	

d Abandoning basins.

e Reconstructing and adjusting basins.

f Raising manhole to grade.

TABLE 8.—*Miscellaneous appropriations in fiscal*

FLUSHING BASINS

No. of order.	Location.	Pipe sewers laid (length in feet).		
		8-inch.	10-inch.	12-inch.
1	Various	18	.....	.....
2	Park street and Piney Branch road <i>a</i> .....	.....	.....	.....
	Total .....	.....	.....	.....

a Basin repaired.

year 1898; work performed by day labor—Continued.

AND CONNECTIONS.

Three-fourths inch lead pipe.	Solder.	Basins constructed.	Cost of materials.	Cost of labor.	Cost of repairs to pavements.	Total cost.
<i>Lin. feet.</i> 211	<i>Pounds.</i> 18½	<i>Number.</i> 7	\$409.01	\$438.83	\$11.53	\$859.37
-----	-----	1	32.07	34.17	-----	66.24
-----	-----	-----	441.08	473.00	11.53	925.61

TABLE 9.—*Number of inspectors, foremen, and other employees of the sewer and property divisions and engineers' stables temporarily required, and appropriations from which paid, for the year ended June 30, 1898.*

Class.	Num-ber em-ployed.	Clean-ing and repair-ing sewers and basins.	Replac-ing ob-structed sewers.	Main and pipe sew-ers.	Suburban sewers.	Rock Creek and B street in-tercept-ing sewer.	Fifteenth and F streets por-tions of Eas-by's Point main in-tercept-ing sewer.	Tiber Creek and New Jersey avenue high level intercept-ing sewer.
Foremen.....	11	\$5,411.33	\$884.50	\$1,472.75	\$694.50	\$72.00	\$95.00	.....
Inspectors.....	18	531.50	161.00	1,341.00	4,316.50	1,545.00	506.00	\$1,398.50
Other employees ..	403	31,078.85	14,404.96	24,543.07	11,484.98	2,501.74	1,905.30	1,557.82
	432	37,021.68	15,450.46	27,356.82	16,495.98	4,118.74	2,506.30	2,956.32

Class.	Automa-tic si-phons.	Asces-sment and permit work.	Repairs to con-crete pave-ments.	Repairing sidewalks and curbs around public reser-va-tions.	Improve-ments and re-pairs, northeast section.	Improve-ments and re-pairs, southeast section.	Improve-ments and re-pairs, north-west section.	Improve-ments and re-pairs, south-west section.
Foremen.....	\$51.00	\$1,344.66	\$61.00	\$4.00	\$15.00	\$20.00	\$34.00	\$18.00
Inspectors.....	76.00	76.00	.....	.....	.....	.....	.....	.....
Other employees...	420.00	22,455.39	536.86	20.18	245.74	188.63	368.47	203.07
	471.00	23,876.05	597.86	24.18	260.74	208.63	402.47	221.07

Class.	Improve-ments and re-pairs, George-town.	Paving North Cap-itol street from O to Q streets.	Paving H street NW. from Twen-ty-second to Twenty-third streets.	Paving Connecticut avenue and Colum-bia road.	Grading and regulating Sherman avenue.	Grading and regul-ating Twelfth street NE. ex-tended.	Grading and regul-ating Kenesaw avenue and Park road.
Foremen.....	\$30.50	\$3.00	\$5.00	\$15.00	\$6.00	\$10.00	.....
Inspectors.....	.....	.....	.....	.....	.....	.....	.....
Other employees ..	306.52	29.65	60.96	267.87	47.46	128.66	\$9.50
	337.02	32.65	65.96	282.87	53.46	138.66	9.50

TABLE 10.—*Average cost per foot of sewers.*

Size.	Length in feet.	Materials.	Labor.	Total.
Eight-inch.....	2,010	\$0.234—	\$0.864+	\$1.098
	1,950	.222+	.864+	1.076
Ten-inch.....	9,611	.293+	.898+	1.191
	8,831	.29—	.816+	1.106
Twelve-inch.....	21,022	.322—	.94+	1.262
	20,762	.322—	.93+	1.253
Fifteen-inch.....	4,549	.385+	1.21+	1.595
Eighteen-inch.....	2,793	.46+	1.26+	1.72
Twenty-one-inch.....	2,209	.577+	1.47+	2.047
Twenty-four-inch.....	1,747	.706+	1.598+	2.303
Eight-inch connections.....	63	.222+	.854+	1.076
Ten-inch connections.....	977	.29—	.816+	1.106
Twelve-inch connections.....	3,055	.322—	.93+	1.253
Fifteen-inch connections.....	561	.385+	1.21+	1.595
Eighteen-inch connections.....	423	.46+	1.26+	1.72
Twenty-one-inch connections.....	36	.577+	1.47+	2.047
Twenty-four-inch connections.....	33	.706+	1.598+	2.303
Basins.....	166	18.287+	16.18+	34.467

NOTE.—Figures in heavy-face type show average cost, with jobs of exceptional difficulty omitted.

REPORT OF THE INSPECTOR OF PLUMBING.

WASHINGTON, D. C., *August 26, 1898.*

SIR: I have the honor to submit herewith the sixteenth annual report of the operations of the division of plumbing inspection, covering the fiscal year ended June 30, 1898. The number of inspections made and recorded comprises a total of 17,550, being a material increase over the work of the previous year. This record comprises 4,853 examinations of existing plumbing; 5,777 inspections of remodeling, extensions, or repairs; 3,274 inspections of plumbing in progress in new buildings; 231 peppermint tests; 928 inspections of gas piping or fixtures; 986 inspections of lead service pipes; 715 sewer taps for connections; 301 new terra-cotta sewer connections laid, and 485 inspections of repairs to existing terra-cotta house sewers.

The volume of clerical work performed is constantly on the increase. In addition to entries made in the record of the inspections above noted, the number of letters and indorsements written and forwarded amounts to 1,653. The distribution of this includes miscellaneous letters, 285; letters to plumbers, 70; orders to repair plumbing, 436, and indorsements on communications to the number of 800. The letters to the Engineer Commissioner originating in this office number 59, in addition to reports of special character, such as a detailed statement of plumbing repairs required in certain public schools, the result of an examination of plumbing in a public school building in Baltimore, a plan and estimate for a system of sewage disposal for the Industrial Home School, and an opinion respecting the practicability of examining and certifying journeymen plumbers.

After consideration of the best method of serving renewed notices to make plumbing repairs, which had heretofore been done through the police department, it was determined that such service should hereafter be personally made by a representative of this office. The number of notices in which personal service was made by this office is 10. This work was done by the sewer tappers in addition to their other duties.

The examination of plans for plumbing proposed in new buildings or in connection with permits for repairs to work in existing buildings has not varied greatly from that of the previous year, the number of plans for new buildings examined and approved having been 745 as compared with 721 in the previous year.

The decision made by the Commissioners, and embodied in the building regulations, not to allow the addition of frame bathroom structures to existing brick buildings is an advance over the previous practice, fully justified by the greater protection afforded piping lines and fixtures located in additions built with brick walls.

It is gratifying to be able to note the accomplishment of additional legislation, approved June 18, 1898, which has resulted in formal authorization of the plumbing board with five members, in the provision of compensation of this board, in the definite restriction of plumbing and gas fitting to licensed plumbers and gas fitters, and in clear requirements rendering it unlawful to make cuts or trenches in public spaces without a permit from the Commissioners. No opposition was encountered in the passage of the act in question, excepting through the desire of the journeymen plumbers to provide for examination and certification for their craft. It is believed that such restrictive measures as are proposed by them will be necessary in the future, and will result in placing responsibility for defective plumbing work more definitely upon the persons who perform that work.

Attention is invited, as in previous reports, to the absence of authorization for the systematic inspection of gas fixtures and piping in order to note their condition and provide for remedying the defects found. It is believed that the enactment of a law giving the inspector of plumbing and his assistants, under the direction of the Commissioners, suitable power to make periodic inspections of the principal hotels and boarding-houses, as to the security of the piping systems and fixtures therein, should be enacted. While it does not appear that during the past year human life has been sacrificed to the cupidity of property owners in allowing the use of improper appliances for the distribution of illuminating gas, the deaths due to such causes noted in the last annual report and in previous reports justify an enlargement of the powers of the Commissioners in this regard. I think it desirable that such legislation as is requested should include suitable authorization of a periodic inspection of plumbing in public buildings and in buildings occupied by numerous residents. The conditions of occupancy, in many cases, introduce such relations with the principal tenant, or agent, or owner that a considerable degree of inconvenience and even known danger from imperfect plumbing appliances do not result in complaint of these imperfections to the proper authorities.

The validity of the plumbing statute and of the regulations made thereunder has not yet been decided in the higher courts of the District, but has been repeatedly sustained in numerous prosecutions in the police court during the past year. In most of these cases it has been the policy of the prosecuting attorney to accept personal bonds or allow a continuance of the case where the defendant would agree to make the repairs directed within a specified period. Eight cases were tried, in five

of which the requirements made by the Commissioners were complied with within the time limit set by the court. A fine of \$25 was imposed in each of three cases, two of which were for failures to remedy defects in terra-cotta house sewers, and one for the construction of a light cast-iron stack in violation of the regulations.

An examination was made by me on September 11, 1897, in cooperation with Mr. Frank Vermillion, of the office of the inspector of buildings, of the recently completed plumbing in Colored School No. 10, Baltimore, Md. The building was found to be a model one, and its appointments in many respects exceedingly satisfactory. The type of architecture, consisting of three stories of six rooms each, with two transverse halls, is quite different from that in use in the District, but exceedingly compact, allowing heating and ventilating apparatus to be arranged for each group of six rooms in a vertical tier, resulting in increased efficiency. The main closet accommodations of the building, located in the basement, consist of a modified form of the Smead trough closet, flushed from a dumping tank and notable in introducing local ventilation to each of the closet seats. The details of the apparatus are well worked out and means of access for cleaning exceedingly good. The urinal was of the ordinary stall type, with perforations near the bottom of the back slab, allowing ventilation at these points. Teachers' closets of good type were also provided in the basement and sinks located on the different floors of the building. As a result of this inspection it was recommended to the Commissioners that a modified type of such closet apparatus, provided with enameled surfaces, be introduced for trial in one of the buildings under construction in the District, and this form of closet is now being installed in the Peabody Annex School.

The efficiency of the force of assistants was maintained at a high standard. The place vacated by the enlistment of Maj. Richard A. O'Brien in the volunteer service was filled by the temporary appointment on May 24 of Martin T. Conboy.

Very respectfully,

CHAS. B. BALL,
Inspector of Plumbing.

Capt. LANSING H. BEACH,
Corps of Engineers, U. S. A.,
Engineer Commissioner District of Columbia.
(Through the Superintendent of Sewers.)

REPORT OF THE SUPERINTENDENT OF PROPERTY.

WASHINGTON, September 21, 1898.

SIR: I have the honor to submit herewith a statement (Table A) showing the amount and cost of the various construction materials which were purchased and delivered in the property yards of the District of Columbia during the fiscal year ending June 30, 1898; also a statement (Table B) showing the amounts in detail paid the employees of this department (other than those carried on the annual pay roll), and the appropriations from which they were paid.

Respectfully,

C. T. SHOEMAKER,
Superintendent of Property.

Capt. LANSING H. BEACH,
Corps of Engineers, U. S. A.,
Engineer Commissioner District of Columbia.

TABLE A.—Showing construction materials purchased from appropriations for 1897-98.

	Granite curbing.		Asphalt block.		Asphalt tiles.		Vitrified paving block.	
	Feet.	Cost.	Number.	Cost.	Number.	Cost.	Number.	Cost.
Cleaning and repairing sewers and basins.....			1, 480	\$94. 52			40	\$0. 80
Assessment and permit work.....	24, 254. 79	\$13, 604. 39	493, 418. 28	\$325. 84	3, 270	\$171. 67	974, 026	\$12, 130. 34
Improvements and repairs.....	25, 161. 96	13, 106. 93	1, 500	89. 25			210, 079	4, 201. 58
Current repairs, streets, avenues, and alleys.....	83. 57	58. 50	8, 680	489. 40			17, 558	351. 16
Repairs, concrete pavements...	2, 590. 85	1, 269. 74					121, 535	2, 430. 70
Deposit and assessment fund...	37. 51	25. 25	3, 000	167. 50			8, 750	75. 00
Pumping expenses and pipe distribution.....			2, 325	133. 49			1, 200	24. 00
Replacing sidewalks and curbs...	1, 266. 25	782. 85						
Construction of county roads...	8, 782. 92	4, 562. 68					125, 245	2, 504. 00
Total	62, 177. 85	\$3, 410. 34	510, 403. 28	\$290. 00	8, 270	\$171. 67	1, 453, 432. 28	\$718. 48

OPERATIONS OF THE ENGINEER DEPARTMENT, D. C. 117

TABLE A.—Showing construction materials purchased from appropriations for 1897-98—Continued.

	Vitrified sewer brick.		Vitrified invert blocks.		Red paving brick.		Red sewer brick.	
	Num-ber.	Cost.	Feet.	Cost.	Num-ber.	Cost.	Num-ber.	Cost.
Main and pipe sewers	50,000	\$775.00	2,500	\$950.00	.....	.....	377,766	\$2,641.58
Suburban sewers	84,041	1,302.00	3,640	1,409.40	.....	.....	62,350	468.38
Replacing obstructed sewers .....	.....	.....	.....	.....	.....	.....	55,050	382.41
Cleaning and repairing sewers and basins	24,400	878.20	.....	.....	.....	.....	122,499	862.52
Assessment and permit work .....	.....	.....	.....	.....	488,498	\$4,023.07	182,156	1,305.70
Tiber Creek and New Jersey avenue high level intercepting sewer	136,628	2,101.03	.....	.....	.....	.....	.....	.....
Current repairs, streets, avenues, and alleys .....	.....	.....	.....	.....	119,333	954.66	.....	.....
Deposit and assessment fund .....	.....	.....	.....	.....	3,200	239.00	.....	.....
Automatic flushing tanks .....	.....	.....	.....	.....	.....	.....	6,600	47.41
Pumping expenses and pipe distribution .....	.....	.....	.....	.....	4,500	360.00	.....	.....
Construction and repairs of bridges .....	.....	.....	.....	.....	.....	.....	31,000	260.13
Completing heating station, hospital department, Washington Asylum .....	.....	.....	.....	.....	.....	.....	10,000	72.30
F street and Eastbys Point intercepting sewer .....	.....	.....	.....	.....	.....	.....	16,900	117.11
Rock Creek and B street intercepting sewer .....	.....	.....	.....	.....	.....	.....	9,600	66.53
Total	295,069	4,556.23	6,140	2,359.40	615,531	5,576.73	873,915	6,224.07

	Sewer pipe.		Portland cement.		Natural cement.		Paving sand.	
	Feet.	Cost.	Barrels.	Cost.	Barrels.	Cost.	Cubic yards.	Cost.
Main and pipe sewers	13,185	\$2,746.59	246	\$458.32	3,500	\$2,169.79	715	\$157.30
Suburban sewers	17,019	4,606.22	236	439.15	2,727	1,690.94	48	10.61
Replacing obstructed sewers	16,952	2,978.96	30	55.80	1,750	1,085.00	.....	.....
Cleaning and repairing sewers and basins	2,948	613.10	118	220.81	858	531.96	.....	.....
Assessment and permit work	28,413	3,748.21	1,064	1,992.53	3,164	1,961.79	2,955	650.14
Tiber Creek and New Jersey avenue high level intercepting sewer	780	31.98	296	555.12	4,344	2,690.49	.....	.....
Improvements and repairs .....	.....	.....	.....	.....	.....	.....	63	13.86
Current repairs, streets, avenues, and alleys .....	.....	.....	.....	.....	.....	.....	1,005	221.03
Deposit and assessment fund .....	.....	.....	54	100.44	3,890	2,411.80	73	16.01
Automatic flushing tanks .....	.....	.....	.....	.....	65	40.30	.....	.....
Repairs, county roads	99	10.80	8	14.78	121	75.02	.....	.....
Pumping expenses and pipe distribution	348	14.86	58	107.88	160	99.20	234	51.48
Replacing sidewalks and curbs .....	.....	.....	.....	.....	4	2.48	.....	.....
Construction and repairs of bridges .....	.....	.....	10	18.60	291	180.42	.....	.....
Fire department	120	45.06	146	271.56	272	168.64	.....	.....
Schools .....	.....	.....	22	40.92	710	418.90	.....	.....
Construction of county roads	579	270.48	.....	.....	.....	.....	.....	.....
Total	80,434	15,066.26	2,288	4,276.01	21,856	13,526.73	5,093	1,120.43

118 OPERATIONS OF THE ENGINEER DEPARTMENT, D. C.

TABLE A.—Showing construction materials purchased from appropriations for 1897-98—Continued.

	Concrete sand.		Screened sand.		Pebbles.		Siphons.	
	Cubic yards.	Cost.	Cubic yards.	Cost.	Cubic yards.	Cost.	Num-ber.	Cost.
Main and pipe sewers.....			325	\$194.80	1,484	\$687.87		
Suburban sewers.....	505	\$196.95	59	35.20	400	180.00		
Replacing obstructed sewers..	876	341.64	62	37.20	764	343.87		
Cleaning and repairing sewers and basins.....			175	105.05	407	183.15		
Assessment and permit work..	1,342	523.90	160	96.30	2,522	1,135.01		
Improvements and repairs.....	7	2.73						
Current repairs, streets, ave- nues, and alleys.....			27	16.20	829	283.35		
Deposit and assessment fund..	1,872	732.00	9	5.40	91	40.95		
Automatic flushing tanks.....			6	3.60	31	14.17	6	\$168.00
Repairs, county roads.....			3	2.10	400	180.00		
Pumping expenses and pipe distribution.....	14	5.46	110	66.00				
Replacing sidewalks and curbs..	1	.39			3	1.20		
Construction and repairs of bridges.....			8	4.80				
Fire department.....	15	5.85			30	13.50		
Total	4,632	1,808.92	944	566.65	6,761	3,043.67	6	168.00

	Boston sewer traps.		Bluestone traps.		Water-stopcock boxes.		Lamp-posts.	
	Num-ber.	Cost.	Num-ber.	Cost.	Num-ber.	Cost.	Num-ber.	Cost.
Cleaning and repairing sewers and basins.....	10	\$60.00	45	\$790.50				
Assessment and permit work..					400	\$182.00		
Lighting.....							399	\$1,971.06
Total	10	60.00	45	790.50	400	182.00	399	1,971.06

	Castings.					Services.	Total.
	Man-hole frames.	Man-hole covers.	Steps.	Alley grates and frames.	Cost.		
Main and pipe sewers.....	132	267	1,000		\$749.55	\$510.75	\$12,021.55
Suburban sewers.....	57	67	500		314.91	652.50	11,806.26
Replacing obstructed sewers..	55	103	200		302.18	245.25	5,772.31
Cleaning and repairing sewers and basins.....	52	124		47	595.35	426.35	4,852.31
Assessment and permit work..	167	294	1,010		939.69	2,240.00	80,030.58
Tiber Creek and New Jersey avenue high level intercept- ing sewer.....	3	3			32.68	510.40	5,921.70
Improvements and repairs.....						683.00	18,097.35
Current repairs, streets, ave- nues, and alleys.....							2,374.30
Repairs, concrete pavements..						166.25	3,866.69
Deposit and assessment fund..							3,513.25
Automatic flushing tanks.....	3	3	25		14.12		267.60
Repairs, county roads.....						48.00	390.50
Pumping expenses and pipe distribution.....							862.37
Replacing sidewalks and curbs..							798.92
Construction and repairs of bridges.....						42.00	505.95
Fire department.....							504.61
Schools.....							458.53
Construction of county roads..						254.95	7,598.01
Completing heating station, hospital department, Wash- ington Asylum.....							72.30
F street and Esbys Point in- tercepting sewer.....						608.73	725.84
Rock Creek and B street inter- cepting sewer.....						923.88	990.29
Lighting.....							1,971.06
Total	479	861	2,735	47	2,948.48	7,312.04	168,147.07

TABLE B.—*Showing list of employees, other than those on per annum roll, and amounts paid to each.*

Name and occupation.	Wages.	Sewers.						
		Main and pipe.	Suburban.	Replacing obstructed.	Cleaning and repairing sewers and basins.	Tyler Creek and New Jersey avenue high level intercepting.	F street and Easbys Point.	Rock Creek and B street intercepting.
L. T. Boisseau, superintendent of property.....	\$4. 75	\$114. 00	\$123. 50	\$52. 25	\$61. 75	\$66. 50	\$128. 25	\$185. 25
C. T. Shoemaker, superintendent of property.....	4. 00				52. 00			
W. J. W. Grey, clerk.....	3. 00	75. 00	78. 00	33. 00	75. 00	81. 00	81. 00	117. 00
C. T. Shoemaker, clerk.....	2. 50							
W. H. Edgar, clerk.....	2. 50	60. 00	65. 00	25. 00	30. 00	35. 00	60. 00	92. 50
H. M. Spencer, clerk.....	2. 50				32. 50			
J. E. Payne, clerk.....	3. 50							
C. J. F. Peirce, clerk.....	4. 00							
Wm. Donaldson, inspector.....	2. 50							
Jno. Peerce, inspector.....	4. 00	52. 00	160. 00	44. 00	52. 00	108. 00	108. 00	156. 00
J. N. Clarkson, inspector.....	3. 00		15. 00					
W. H. Voss, storekeeper and inspector.....	2. 50							
H. M. Dickinson, storekeeper and inspector.....	3. 00	75. 00	78. 00	33. 00	39. 00	81. 00	81. 00	117. 00
Geo. E. Clark, storekeeper and inspector.....	3. 00	75. 00	78. 00	33. 00	39. 00	81. 00	78. 50	117. 00
Chas. Baluff, stonecutter.....	2. 50				12. 50			
Edward Morris, messenger clerk.....	4. 50							
C. T. Shoemaker, laborer.....	2. 00	50. 00	52. 00	22. 00	26. 00	54. 00	54. 00	78. 00
Laborers.....	1. 75							
	1. 50	9. 75	3. 00	3. 00	6. 60	3. 90	17. 98	61. 11
Total.....		510. 75	652. 50	245. 25	426. 35	510. 40	608. 73	923. 86

Name and occupation.	Wages.	Improvements and repairs.	Assessment and permit work.	Repairs to concrete pavements.	Construction of county roads.	Connecticut avenue and Columbia road.	Construction and repair of bridges.	Repairs to county roads.	Total.
L. T. Boisseau, superintendent of property.....	\$4. 75	\$123. 50	\$437. 00						\$1, 292. 00
C. T. Shoemaker, superintendent of property.....	4. 00			\$28. 00	\$52. 00				132. 00
W. J. W. Grey, clerk.....	3. 00	78. 00	276. 00				\$42. 00		936. 00
C. T. Shoemaker, clerk.....	2. 50	62. 50	135. 00						197. 50
W. H. Edgar, clerk.....	2. 50		53. 75	15. 00					436. 25
H. M. Spencer, clerk.....	2. 50								
J. E. Payne, clerk.....	3. 50			11. 25	43. 50				87. 25
C. J. F. Peirce, clerk.....	4. 00		6. 00						6. 00
Wm. Donaldson, inspector.....	2. 50	30. 00	2. 50						32. 50
Jno. Peerce, inspector.....	4. 00	104. 00	308. 00		52. 00		\$48. 00		1, 252. 00
J. N. Clarkson, inspector.....	3. 00								15. 00
W. H. Voss, storekeeper and inspector.....	2. 50		5. 00						5. 00
H. M. Dickinson, storekeeper and inspector.....	3. 00	78. 00	276. 00	42. 00	39. 00				939. 00
Geo. E. Clark, storekeeper and inspector.....	3. 00	78. 00	276. 00	42. 00	39. 00				936. 50
Chas. Baluff, stonecutter.....	2. 50	62. 50	175. 00						250. 00
Edward Morris, messenger clerk.....	4. 50					\$0. 45			. 45
C. T. Shoemaker, laborer.....	2. 00	52. 00	184. 00	28. 00	26. 00				626. 00
Laborers.....	1. 75		21. 00						21. 00
	1. 50	14. 50	24. 75		3. 00				147. 59
Total.....		683. 00	2, 240. 00	166. 25	254. 50	. 45	42. 00	48. 00	7, 312. 04

120 OPERATIONS OF THE ENGINEER DEPARTMENT, D. C.

REPORT OF THE INSPECTOR OF ASPHALT AND CEMENTS.

WASHINGTON, August 1st, 1898.

SIR: The work of testing done in this office during the year may be summarized as follows:

Hydraulic cement:

Natural, brands 5, samples	6,068
Portland, brands 12, samples	2,318
	<u>8,386</u>

Asphalts:

Crude Trinidad, three cargoes, samples	20
Refined Trinidad, samples	3
Residuum oils	32
Surface mixture	109
Miscellaneous asphalts	15
	<u>179</u>

Sands	9
Gravels	14
Waters	71
Gasoline	5
Miscellaneous experiments, etc	16
	<u>115</u>

Total 8,680

HYDRAULIC CEMENTS.

The number of barrels inspected and the average results of tests of each brand of cement will be found in the following tables:

NATURAL CEMENTS.

The 6,068 samples of natural cement represent 61,344 barrels, of which 2,173 were rejected.

TABLE A.—Natural cements.

Brand.	Num-ber of barrels.	Num-ber of sam-ples.	Per cent resi-due, 100 mesh.	Initial set, min-utes.	Per cent water used.		Tem-per-ature of air and water.	Tensile strength.				
					Neat.	2 parts sand.		1 day, neat.	7 days, neat.	28 days, neat.	7 days, 2 parts sand.	28 days, 2 parts sand.
Cumberland	19,700	1,722	14.2	30.6	30.6	14.1	75.7	134	247.8	.....	137.4	.....
Cumberland and Potomac	3,676	369	17	31.6	30.7	14.5	77.3	133	259	.....	167.6	.....
Lawrenceville	5,300	530	7.1	47	25.3	12.8	80.4	127	205	.....	100.6	.....
Potomac	29,727	3,162	13.1	23.1	28.2	13.8	73.7	72.8	134.5	280	70.1	109.4
Round Top	2,941	286	13.8	32.4	31	14.3	76.1	109	195	.....	142.7	.....

PORTLAND CEMENTS.

The 2,318 samples of Portland cements represent 22,695 barrels, of which 400 were rejected.

TABLE B.—Portland cements.

Brand.	Number of barrels.	Number of samples.	Per cent residue, 100 mesh.	Initial set.	Per cent water used.		Temperature of air and water.	Tensile strength.		
					Neat.	3 parts sand.		1 day, neat.	7 days, neat.	7 days, 3 parts sand.
Alpha	1	10	6	A. m.	20	10	78	216	785	308
Atlas	7,450	745	5.6	3 41	18.1	8.5	75	438	725	234.2
Brooks Shoo-bridge	100	10	6	3 22	20	10	78	400	597	215
Dyckerhoff	400	40	6	4	18.1	9	70	371	564	155
Griffith	100	10	15	5	20	9	78	231	409	140
Heyn	2,310	230	8.2	3 15	19.5	9.7	78	484	628	219
Knickerbocker	1	10	1	5	20	10	78	220	506	224
Patapasco	1	10	1	6	17	8	70	281	481	231
Porta	500	50	7.2	1 20	19	8.2	83	395.6	518.6	157.8
Saylor	1	10	5	5	19	9	79	454	678	239
Taltie	1	10	1	6	16	8	70	244	638	176
Vulcanite	11,830	1,183	6.4	3 6	19.3	9.5	73	304.2	767	269

LONG-TIME TESTS ON NATURAL AND PORTLAND CEMENTS.

It should be understood that the tests given in the following tables are not supposed to show the relative strength of the different brands, but merely to exhibit the relative gain in strength with age. It can readily be seen by consulting the tables of average tests on cements in this and former reports that some of the samples of cement used in making up these tests are below, while others are above, the average of their respective brands. In collecting these samples we endeavored to get as near an average sample as possible by mixing samples taken from a number of barrels.

TABLE C.

Brand of natural cement.	Per cent of water.		Temperature of—		Tensile strength.							
	Neat.	2 parts sand.	Air.	Water.	Neat.		2 parts quartz.					
					1 day.	7 days.	7 days.	14 days.	21 days.	1 month.	2 months.	3 months.
Antietam.....	32	15	89	88	62	168	48	103	110	124	158	162
Black Diamond.....	29	14	80	80	81	162	83	.....	.....	126	185	212
Cedar Cliff.....	33	15	90	90	88	185	85	145	152	195	252	255
Cumberland.....	32	15	90	91	169	218	156	208	290	297	307	356
Cumberland and Potomac.....	32	15	91	91	146	204	188	196	220	225	315	403
Lawrenceville.....	.....	13	70	70	.....	.....	84	102	133	148	206	278
Shepherdstown.....	31	14	91	92	61	145	106	144	161	210	227	265
Union, mixed with 3 parts quartz.....	22	10	76	75	94	130	74	93	160	181	194	236
Improved Union, mixed with 3 parts quartz.....	21	10	70	68	102	116	95	.....	.....	132	178	162
Round Top.....	32	14	90	90	81	203	122	188	233	255	305	342

Brand of natural cement.	Tensile strength.											
	2 parts quartz.											
	4 months.	5 months.	6 months.	7 months.	8 months.	9 months.	10 months.	11 months.	1 year.	2 years.	3 years.	4 years.
Antietam.....	161	173	185	180	188	203	228	230	231	240	246	.....
Black Diamond.....	305	.....	.....	.....	290	298	304	346	364	384	385	312
Cedar Cliff.....	256	270	290	309	.....	.....	.....	.....	.....	.....	.....	.....
Cumberland.....	366	357	350	355	416	406	429	434	438	446	441	424
Cumberland and Potomac.....	388	384	397	394	406	388	423	428	436	490	506	500
Lawrenceville.....	290	293	291	293	290	288	295	293	321	.....	.....	.....
Shepherdstown.....	283	272	281	305	321	300	301	315	366	356	337	362
Union, mixed with 3 parts quartz.....	240	244	238	257	262	267	272	306	312	364	344	.....
Improved Union, mixed with 3 parts quartz.....	198	226	232	258	276	280	295	331	322	326	283	.....
Round Top.....	371	378	387	383	413	428	444	551	515	561	566	514

TABLE D.

Brand of Portland cement.	Per cent of water.		Temperature of—		Tensile strength.						
					Neat.		3 parts quartz.				
	Neat.	3 parts quartz.	Air.	Water.	1 day.	7 days.	7 days.	1 month.	2 months.	3 months.	4 months.
Alpha	21	9	80	80	.....	.....	105	182	310	309	310
Alsen	20	10	70	65	292	635	188	310	290	328	385
Atlas	20	10	90	90	432	768	321	441	441	510	519
Dufosse & Henry	20	10	70	70	149	546	159	188	229	277	300
Dyckerhoff	21	10	70	70	345	566	164	175	192	236	257
Egypt	20	10	68	65	188	278	159	205	255	240	285
Giant	21	11	72	72	160	495	230	275	275	267	296
Hannover	20	10	68	65	295	571	205	244	251	277	301
Hemmere	20	9	78	78	295	657	159	203	286	301	323
Heyn	20	10	68	68	.....	496	158	258	281	356	372
Mannheimer	20	10	78	78	329	525	193	226	306	329	335
Porta	20	10	70	68	407	415	181	257	305	319	315
Saylor	20	8	82	82	201	461	135	156	205	203	254
Standard silica cement, 1 to 1	22	10	80	80	206	541	216	226	285	319	336
Standard silica cement, 1 to 6	22	10	80	80	21	97	46	89	96	94	108
Vulcanite	18	9	74	74	.....	.....	211	276	291	297	284

Brand of Portland cement.	Tensile strength.								
	3 parts quartz.								
	5 months.	6 months.	7 months.	8 months.	9 months.	10 months.	11 months.	1 year.	2 years.
Alpha	295	327	346	284	295	319	345	350	811
Alsen	380	390	381	379	383	374	377	366	371
Atlas	529	538	538	515	501	560	572	546	523
Dufosse & Henry	320	319	316	328	332	335	331	332	335
Dyckerhoff	293	298	315	315	332	340	345	323	370
Egypt	361	341	351	362	360	375	402	394	417
Giant	329	325	351	286	304	300	308	327	342
Hannover	315	315	311	317	335	340	348	354	355
Hemmere	329	314	341	356	345	310	308	347	325
Heyn	350	341	314	337	358	350	364	396	.....
Mannheimer	323	343	342	352	321	341	316	336	334
Porta	322	343	250	275	303	329	339	329	349
Saylor	277	289	276	264	279	295	222	279	290
Standard silica cement, 1 to 1	364	384	377	377	385	394	367	379	366
Standard silica cement, 1 to 6	127	130	135	146	168	187	183	192	.....
Vulcanite	306	331	294	.....	.....	.....	.....	.....	.....

ASPHALTS.

During the year three cargoes of crude Trinidad asphalt were received, from which 20 samples were taken for analyses. The average per cent of bitumen soluble in carbon disulphide was 53.37, and in all other respects found to be up to the standard as specified by this office.

Refined asphalt.—Samples of the refined asphalt were taken from the tanks as the different cargoes of crude were refined and sent for examination. All were found to be up to the requirements.

Residuum oil.—Of the 32 samples submitted from the different paving companies 4 were rejected.

Asphalt cements.—Penetrations of the asphalt cement used by the different companies in each day's work have been taken, with the following results:

	Barber Paving Co.	Cranford Paving Co.
Average penetration at 77° F	91	83
Highest penetration at 77° F	96	90
Lowest penetration at 77° F	90	77

Surface mixture.—During the year 109 samples were submitted—24 from the Barber Asphalt Paving Company and 85 from the Cranford Paving Company. The following table shows the maximum, minimum, and average per cent bitumen they contained and the mesh composition of the sand used by the different companies:

TABLE E.

	Barber Paving Co.	Cranford Paving Co.
Number of samples.....	24	85
Average per cent bitumen.....	11.3	10.5
Lowest per cent bitumen.....	10.0	9.5
Highest per cent bitumen.....	13.0	12.0
Sand:		
Per cent retained on sieve having—		
20 mesh per linear inch.....	2.5	3.5
40 mesh per linear inch.....	21.0	29.0
60 mesh per linear inch.....	35.0	33.0
80 mesh per linear inch.....	8.5	7.0
100 mesh per linear inch.....	10.0	8.0
Passed 100 mesh per linear inch.....	24.0	19.0

New asphalts.—Of the several samples presented during the past year but two are of special interest to paving. They were from the Western Oil and Asphalt Company, of Los Angeles, Cal., and the California Asphaltum Company. The former presented three samples—one of refined, one of asphaltic oil, and one of cement. As I understand, the cement is made by combining the refined with the asphaltic oil. I am of the belief that a good pavement can be constructed with this material. The California Asphaltum Company presented a sample of their asphalt cement. This, I believe, is made in a similar manner to the Pittsburg flux, as described in last year's report, excepting in place of Eastern petroleum residuum California petroleum residuum, or asphaltic oil, is used. It possesses the good qualities of Pittsburg flux—that is, but slightly susceptible to change of temperature—but differs from it in being adhesive instead of waxy, which better adapts it to the use of paving. If properly handled, there is no reason why it should not produce some of the best of pavements.

SANDS AND GRAVELS.

Nine samples of sand and 14 samples of gravel were submitted for test and comparison, and reports on each were made to the offices from which they were submitted.

WATER.

Of the 71 samples of water submitted by the water department 20 were condemned. They may be summarized as follows:

	Good.	Suspicious.	Condemned.
Northeast.....	4	4	7
Northwest.....	5	3	9
Southeast.....	15	14	7
Southwest.....	1	1	4
County.....	3	.....	1

INVESTIGATIONS.

During the past year an investigation as to whether petroleum residuum is a good softening agent or flux for asphalt has been instituted. In speaking here of petroleum residuum I refer to that manufactured from the petroleum oils of the Eastern United States. It is that portion of the petroleum that remains after the light oils and lubricating oils have been removed by distillation. These residuums are composed largely of the higher members of the paraffin series, with some unsaturated hydrocarbons, and must not be confused with those of the Western and some foreign petroleum which are composed largely of hydrocarbons belonging to unsaturated series and are asphaltic in character. It may be well before proceeding to explain why this point, which appears of little moment, is of sufficient importance to investigate. In the manufacture of asphalt pavements it is often found necessary, on

account of the hardness of the asphalt in use to soften it by the admixture of a softer asphalt or oil. This is the case with all the asphalts used in this city and the large majority of those used throughout the country. In the case of Trinidad asphalt, which is used more extensively than any other, petroleum residuum is used as the softening agent, and for the manufacture of a desirable paving cement on an average of 18 pounds of residuum is mixed with 100 pounds of refined Trinidad asphalt, and when we consider that the refined asphalt is but 56 per cent pure bitumen, it is seen that the bitumen of a Trinidad asphalt cement is composed of 24.32 per cent residuum and 75.68 per cent of asphalt bitumen. When so large a quantity of flux is necessary it is very important that it should possess properties that would suit it for paving purposes, and also that the asphalt bitumen should be completely soluble in it.

On looking into the physical properties of the better petroleum residuums, it is found to be a heavy, thick oil at 70° F., which begins to solidify at 58° F., and becomes solid on cooling to 48° F., this solidification being due to a crystallization of a portion of its constituents. At a temperature of 90° F. it becomes very limpid. It is very nonadhesive in character, and when in a solid condition from cold or other causes it is very waxy in consistency and entirely lacking in cementing properties. As regards its stability, it gradually loses its fluidity with age. This seems rather strange, as it is composed largely of saturated hydrocarbons, and it would be only natural to suppose, from theory, that they would be very stable bodies—much more so than oils composed more largely of unsaturated hydrocarbons. This theory was so ably discussed by Richardson¹ about a year ago that I will not go into it. The theory in question, however, is lacking in this very essential point, that it is not carried out in practice. The truth of this is forcibly illustrated by examining the condition of the samples of residuums which have been submitted by the several paving companies in this city during the past four years. These samples are in quart cans, well corked, and have been kept in a room in which the temperature has seldom gone below 70° F. On examining the samples over six months old, with the temperature of the room at 75° F., a large majority were found to be of the consistency of jelly, some stiffer than others. On examining all the samples over a year old, with the temperature of the room at 90° F. and after a week of warm weather, during which time the temperature had not been below 85° F., out of 40 samples 12 were found in a solid condition. It is hard to account for why this hardening takes place, but it can be induced and made more rapid in many cases by exposing the residuum in small quantities to a moderate heat or an intense cold for a short time. It is apparently caused by the separation from the residuum of a light-brown apparently amorphous solid, which, after having once formed, alters the physical character of the residuum in this respect, that the temperature of its solidifying point is much raised.

On examining a drop of fresh petroleum residuum under the microscope by transmitted light it is found to be an amber-colored fluid with more or less paraffin crystals and a black substance floating through it. This black substance is often mistaken for coke, but it is completely soluble in carbon disulphide, chloroform, and turpentine and insoluble in petroleum naphtha. If this drop of residuum is put aside for several days and then again examined with a microscope, it will be found that another substance has made its appearance in the shape of a light brown amorphous solid which melts at a temperature of about 105° F. The formation of this substance can also be induced by heating a drop of residuum for five minutes at a temperature of 170° F., or by exposing to a temperature of 10° F. or lower, for about half an hour. This latter indicates that this formation is brought about by molecular change rather than by evaporation or oxidation. It is evidently the formation of this solid which causes the residuum to gradually lose its fluidity with age, as before mentioned. By the use of polarized light the large majority of these oils are found to contain minute paraffin crystals, which I find increase largely in size and number after the residuum has been heated to a high temperature for even a short time. On being kept at a high temperature for a length of time (400° F. for thirty hours in closed retort), although they lose but little in distillate yet they are considerably altered in composition and consistency, so much so that it is very evident that the change is not due to the small loss of light oil but to molecular change. In some very few cases the character of the residuum appears to be benefited by this heating, as it is less susceptible to change in temperature than formerly, and when cooled until solid is more cementitious. In these few cases the molecular change above spoken of can not be noticed.

As to the solubility of asphalt bitumen in petroleum residuum, I have devoted all my time so far to Trinidad asphalt, as it is by far the most extensively used here as well as in other cities. As I have before stated, the bitumen of a Trinidad asphalt cement is at least one-fourth petroleum residuum. When so large a quantity of

¹ Municipal Engineering, vol. 13, No. 1, page 1.

softening agent or flux must be used, it is only reasonable to suppose that the best results can not be obtained unless the bitumen of the asphalt is completely soluble in the flux used.

The point as to whether petroleum residuum completely dissolves the bitumen of Trinidad asphalt has been an open question for several years past. Peckham, in 1895, criticises the use of petroleum residuum for this purpose, and states that the asphalt is insoluble in it, but gives no reason for the statement. In an article by myself on specifications for asphalt pavements, written in 1896, I object to the use of residuum for fluxing asphalts, and among other objections I make to it is that I do not believe the asphalt completely soluble in it. This opinion of mine was based on observations made while trying to soften some of the harder asphalts by admixture with residuum. In some cases I found it impossible to dissolve the asphalt in the residuum even after prolonged stirring at a temperature above the melting point of the asphalt, while these same asphalts were easily miscible in Western petroleum residuum having an asphaltic base.

Other circumstances have in the past led me to infer that there was no complete solution, but until the present I have never attempted to make any definite demonstration of the truth of my convictions. About a year ago Richardson, in an article on Solubility of Asphalt Hydrocarbon in Petroleum Residuum,¹ claims to prove that the bitumen of Trinidad asphalt is completely soluble in petroleum residuum; but the two experiments on which he bases his claim are by no means convincing, as can be seen. In his first experiment in which he allows a tank of Trinidad asphalt cement to stand in a melted condition for a week without agitation, he finds upon examining samples of cement from the top and bottom of the tank, that there is no particular difference in the composition of these samples as far as the constituents of the bitumen is concerned, and merely an increase of from 5 to 6 per cent of mineral matter in the bottom over the top. The fact of his getting such a slight increase in mineral matter in the bottom over that from the top shows that the subsidation was very incomplete, and surely not sufficient to allow any insoluble bitumen, which is of about half the gravity at least of the mineral matter, to subside. In the other experiment he extracts the bitumen from Trinidad asphalt with chloroform, evaporates off the solvent, and adds to this pure bitumen the quantity of petroleum residuum equivalent to the amount used in making an asphalt cement. On examining this asphalt cement with a high-power microscope he finds that it appears to be perfectly homogeneous. One great fallacy in this experiment is in the pure bitumen extracted from the refined asphalt by means of chloroform. I have found in trying to obtain a pure bitumen by extracting with chloroform and carbon disulphide and evaporating off the solvent that it is impossible to remove all the solvent from the bitumen without heating it to such a temperature that it would destroy the original character of the asphalt. I know of other experimenters who have experienced the same difficulty in removing all the solvent and have at times thought themselves successful, as not the slightest odor could be noticed on the sample, but upon opening the box containing the sample after it had been packed away for several weeks the odor of the solvent could be plainly detected.

In beginning my work on this subject, I was much puzzled as to how to accomplish my end. The impurities in the asphalt, amounting to 44 per cent, made microscopic examination useless, and as I was unable to get the asphalt in so liquid a state from heat that it would filter even under an exhaust, I had to abandon the idea of working on the pure asphalt bitumen. I then tried filtering an asphalt cement taken from one of the paving yards, made of 100 parts of refined Trinidad asphalt, 19 parts of petroleum residuum, but with no better success even when rendered quite liquid with heat and using a high exhaust. After the addition of a quantity of residuum to this cement sufficient to make a mixture having equal quantities of refined asphalt and residuum, filtering through a Goosch crucible was again tried with an exhaust of 24 inches of mercury and with the mixture kept in a liquid condition at 325° F. Only a small fraction of a cubic centimeter was obtained before the filter gummed up. This filtrate upon microscopic examination at normal temperature was found to be composed of two bitumens, one suspended in the other in the form of small globules. On heating, these globules disappeared and apparently went into solution in the other bitumen. These globules did not immediately form on cooling, but required at least twenty-four hours before again developing. I then added double the quantity of residuum, making a mixture of two parts residuum to one part refined Trinidad asphalt, and incorporated them by stirring at a temperature of 300° F. I was now able to filter about 20 cubic centimeters through the Goosch crucible kept at a temperature of 300° F., with an exhaust of 24 inches mercury. The filtering was very slow, and in an hour or two had practically ceased. This filtrate was examined under the microscope and was found to resemble the last one except that the globules of the insoluble bitumen were fewer in number. Analyses to determine the total

¹Municipal Engineer, Vol. 13, No. 2, p. 67.

bitumen soluble in carbon disulphide and petroleum naphtha, which were made on this filtrate and on the portion left in the Goosch filter, which was largely composed of the unfiltered mixture, resulted as follows:

	Filtrate.	Residue.
	Per cent.	Per cent.
Bitumen soluble in naphtha	93.75	67.38
Bitumen insoluble in naphtha soluble in carbon disulphide	6.20	7.02
Earth residue and foreign organic .....	.05	25.60
Portion of total bitumen soluble in naphtha	93.79	90.56
Portion of total bitumen insoluble in naphtha	6.21	9.44

From the above it is very evident that there is marked difference in the bitumen that filtered through and that left on the filter. In taking these results and those from the microscopic examination of the filtrate we are led to the conclusion that the bitumen of Trinidad asphalt is not completely soluble; that it is more soluble in hot residuum than in cold, and that this extra amount that goes into solution on heating separates out on cooling. As these experiments were carried out on a mixture much richer in petroleum residuum than is ever used in practice, it was considered advisable to make further investigations that could not be open to this criticism. Two cements were obtained from a paving yard, one such as is used in the topping mixture, composed of 100 parts refined Trinidad asphalt to 19 parts of petroleum residuum. The other such as is used in the binder course, composed of 100 parts of refined Trinidad asphalt and 25 parts of residuum. A third cement was made in the laboratory by thoroughly incorporating 100 parts refined Trinidad asphalt with 27 parts of a good quality asphaltic oil, or as some have called it, a California petroleum residuum. Portions of these three asphalt cements were melted into large test tubes, these tubes being filled to within an inch of the top. They were then placed in a hot oven in a vertical position and kept at a temperature averaging 300° F. for forty-eight hours, thus allowing a subsidence to take place while the cements were in a melted condition. After being allowed to cool, the tubes were broken and analyses made in each case on material taken from the top and bottom of the tubes, care being taken, however, to discard the immediate top of each tube as they showed signs of being oxidized. These results will be found in the accompanying table.

TABLE F.

	Topping cement.			Binder cement.			Asphalt oil cement.		
	Original.	Top of tube.	Bottom of tube.	Original.	Top of tube.	Bottom of tube.	Original.	Top of tube.	Bottom of tube.
Total bitumen soluble in carbon disulphide	Per ct. 63.91	Per ct. 71.86	Per ct. 36.88	.....	Per ct. 80.57	Per ct. 41.22	Per ct. 65.42	Per ct. 76.10	Per ct. 36
Naphtha soluble bitumen ..	45.86	53.06	25.62	.....	62.61	30.71	49.08	56.95	26.94
Earthy and foreign organic matter	36.09	28.14	63.12	.....	19.43	58.78	34.58	23.90	64
Total bitumen soluble in naphtha	71.66	73.87	68.06	.....	77.71	74.50	75.02	74.84	74.83
Total bitumen insoluble in naphtha	28.34	26.13	31.94	.....	22.29	35.50	24.98	25.16	25.17

On examining these results we find in the case of the two cements made with petroleum residuum that several per cent of the asphalt bitumen has been rendered insoluble by the addition of the residuum, and that this insoluble bitumen is held in suspension and will settle out as so much inert material. It is impossible to even approximate the quantity of insoluble bitumen, but it must be quite some more than has settled in these experiments, for being of much less gravity it is only reasonable to believe that proportionally less of it would settle than of the mineral ingredients, and there are still quite some of these held in suspension. Combining with all this what we learned in the previous experiment (that more of the asphalt bitumen was soluble in hot residuum than in cold) the quantity of this bitumen insoluble in the residuum at normal temperatures must be considerable. In the case with the cement of asphalt oil we find that even though there was quite as much mineral matter subsided, yet the bitumen is of uniform composition throughout the tube, showing a complete solution. Judging from the physical properties of petroleum residuum and its chemical relation to asphalt bitumen it is not a desirable flux, but it should

not be judged too strongly in the absence of physical tests carried on on the asphalt cement made with it. Such an investigation is in progress comparing asphalt cement made with petroleum residuum and several asphalt oils as fluxes with Trinidad asphalt, along with several other well-known asphalt cements.

The comparisons to be made are: Susceptibility to change in temperature, rapidity of aging, loss and change in consistency on keeping at high temperatures for a length of time, and the action of water on paving mixtures made with the several cements. Some results have been obtained on this investigation, but they are too few and incomplete to be of use in forming conclusive opinions.

There is one thing before closing that can be said, and that is that the old objections raised to asphaltic oils as fluxes are no longer tenable. I have found asphalt oils that lose less and are much less changed in all respects on being kept at high temperatures than some of the best petroleum residuums. There are several asphalt cements that I have found, two of which are on the market, that contain no petroleum residuum, but yet lose less and are less altered in consistency than a Trinidad asphalt cement made with residuum.

A NEW APPARATUS FOR DETERMINING THE RELATIVE VISCOSITY OF ASPHALTS AND ALLIED BODIES.

It was not long after the laying of the first asphalt pavement, made under the De Smedt patent, which consists of an artificial mixture of a more or less pure asphalt cement with sand and dust, that the question presented itself of how to determine when the asphalt cement was of the proper degree of softness or consistency. I use here the word softness or consistency to better express my meaning to those who are not acquainted with the physical properties of asphalt and asphalt cements (more correctly speaking it is viscosity, but this might convey the idea that asphalt cements were fluids in the sense which is generally understood). If we look into the properties of asphalts and asphalt cements, such as are suitable to be used in pavements, we find that they are, truly speaking, fluids; that they have a marked flow at ordinary temperatures, and that they will flow until stopped by some confining body or until an equilibrium has been reached. To illustrate the flow of these very thick liquids, an asphalt, which was so hard that the pressure of a nail hardly left an imprint, was molded in the shape of an ordinary brick. This asphalt brick was placed on end in a room that was kept at ordinary temperatures. In the course of several months it flattened down into a pat but three-quarters of an inch in thickness.

An asphalt cement which is really nothing more than an asphalt of the proper consistency to be used for paving is so fluid that it must be kept in a tight box, and if a small piece of metal should be left on its surface it will sink from view in a day or two. This viscosity of asphalt increases or diminishes as its temperature is raised or lowered. For this reason great care should be taken in comparing two or more samples that they be all of the same temperature. The first method devised to determine whether an asphalt cement was of the proper degree of softness to produce a good pavement was by chewing a small piece and judging by the resistance it offered to the teeth. This method is not as inaccurate as it would seem at first to be. All mouths are pretty near the same temperature, and the general rule followed was that if an asphalt cement chewed easily and yet was not soft enough to adhere to the teeth it was of the proper consistency for paving. This method is, however, not all that could be desired, as the viscosity could not be expressed numerically, and then, as knowledge as to the way of laying asphalt pavement increased, it was recognized that to produce the best results the viscosity of the cement should differ in different climates, and also according to the character and proportion of sand and dust used.

In 1888 Mr. Bowen, then head chemist for the Barber Asphalt Paving Company, filled the long-felt want for such tests by devising an apparatus to determine the relative viscosity or softness of asphalt and allied bodies. The principle of his apparatus, which is generally spoken of as a penetration machine, is to determine the distance a weighted needle will penetrate into an asphalt at a standard temperature in a given time. This is accomplished by having a large needle inserted in the end of a weighted lever arm. This lever arm is suspended by a linen thread from a spindle around which it is wrapped. At one end of this spindle is fastened a pointer which indicates on a dial the distance up or down moved by the lever arm carrying the needle. On this spindle is a small drum round which winds a thread supporting a weight which acts as a partial counterbalance to the weight of the lever arm. This counterweight keeps the lever thread taut, and when the lever arm is raised it returns the pointer on the dial. The viscosity of a sample is determined by placing it under the needle, which is then lowered until its point just touches the surface of the sample. The position of the pointer on the dial being noted, a clamp is released which allows the needle to penetrate into the sample for any fixed time. At the end of this time the clamp is closed and the distance the needle has penetrated can be

read from the dial. Care must be taken that all samples be kept at a standard temperature for at least half an hour before making the test. This is accomplished in several ways, the most accurate being to keep the machine and samples in a small room kept at a standard temperature.

The method most generally in use at paving yards, or where it is impracticable to keep a room for this purpose, is to keep the samples in a tank of water at the standard temperature. To make the test the sample is quickly removed, dried and tested, as before. Unless the temperature of the room is abnormally high or low, two or three tests can be made on the sample before its temperature is sufficiently changed to materially affect the results. I have used a modification of this method that works very well, doing away with the errors caused by the evaporation of water from the surface of the sample, and the influence the temperature of the surrounding air has on it after removal from the water tank. A small glass dish is kept in the tank with the cements, and when a test is to be made the sample is removed from the tank in this dish, being completely covered with water of the standard temperature. The needle is then set to the surface of the sample as before, by looking through the sides of the glass vessel, and the test made while the sample is submerged. That this apparatus of Mr. Bowen has proved itself practical and useful for the work it was intended will be better appreciated when I say that there are at least twenty-five paving yards throughout the country equipped with it. They are operated by the foreman in charge of the yard or his clerk, and it is remarkable what good results are obtained. It can be seen that the field of usefulness of this apparatus in its present form is limited to determinations made at or near the normal temperature, while it is often desirable to compare the viscosity of asphalts, etc., at, say, winter or summer temperatures. Another objection is that it is impossible to accurately determine the exact weight acting to force the needle into the sample owing to the friction at the fulcrum of the arm and the friction of the spindle in its bearings, and also calculate the force expended in overcoming the inertia of starting the several portions of the machine into motion, and it is impossible to get concordant results with two machines unless they are built exactly alike.

In the machine I have devised I have endeavored to overcome these objections. The tests are all made in a water-jacketed copper box. Any temperature can be obtained in this box by running through the jacket water cooled or heated as desired. The needle penetrates under a direct weight with practically no friction. The description of this apparatus in detail is as follows: The penetrating needle, which is an ordinary No. 2 sewing needle, is rigidly fastened in the end of a small brass rod. This rod is inserted in the end of an aluminum tube, about 40 centimeters in length and 1 centimeter in diameter, where it is securely fastened by means of a binding screw. By filling or partially filling this tube with mercury it can be made of any desired weight from 30 to 300 grams, after which it is closed by a cap which screws on to the end opposite the needle. When this cap is screwed into place, its surface, which is perfectly flat, is absolutely at right angles to the sides of the tube. The aluminum tube holding the needle passes down through a wooden framework in which it is held in a vertical position, with the needle end down, by means of a jaw clamp. When this clamp is released the tube can move freely up or down, while it is retained in its vertical position by two guides. These guides are each made of two metal plates a fraction of a centimeter in thickness. Each plate has a semi-circular piece cut out of one side, so that when the two are placed together it leaves a circular opening through which the aluminum tube passes freely, but yet not so freely as to get out of the vertical. To facilitate the removal of the needle tube from the framework, as it must be slightly inclined while withdrawing so as to clear the measuring device, the guides are constructed so that one plate in each can be pushed a short distance from the other, thus allowing the inclination of the tube. These plates are returned to their original position by springs.

In the upper part of the framework directly over the tube is a spindle 3.17 millimeters in diameter, with a pointer on one end which turns on a dial. A small plumb weight is suspended from the spindle by a fine platinum thread which winds on it. This weight is partly counterbalanced by a second weight suspended from the spindle by a linen thread. These weights are so that if they be allowed to move freely the former is just sufficiently heavy to cause it to fall gradually, and when the aluminum tube is in position this weight will fall until it just touches the surface of the cap on the top of the tube. The fall of 1 centimeter of this weight causes the spindle to make one revolution, thus making one revolution of the pointer on the dial equivalent to 1 centimeter. The above framework is fastened onto the cover of a copper chamber, the aluminum tube projecting through this cover into the chamber, needle end down. This cover, which is of wood, is made in two thicknesses, with an air chamber between, thus more perfectly insulating the interior of the chamber from the outside air. It is supplied with two large windows on each side of where the needle tube passes in, admitting light and allowing the operator to see the sample. The chamber to hold the samples, which is of thin sheet copper, is constructed with a rounded bottom like a kettle, and is fitted with a flat false bottom or flooring of sheet iron.

Raised above the flooring about an inch, resting on three rollers, is a circular disk, on which the samples to be tested are placed in a circle about half an inch from the edge. This disk can be rotated like a turntable by means of an iron rod which passes through its center into a bearing on the floor and out through the cover of the chamber, where it is fitted with a wheel. By turning this wheel, thus revolving the disk, each sample on it can be brought in turn under the penetrating needle. In this way twelve samples can be tested by this particular apparatus without opening the chamber. Two swinging mirrors are fastened—one on each side of the copper chamber—one mirror being so adjusted as to throw light on the sample to be tested, while the other reflects the image of the sample so that it can be seen by looking in through a window in the cover. This copper chamber is fastened into a lead-lined tank, which is filled with water of any degree, or a freezing mixture, as the case may be, to produce the desired temperature in the chamber. To keep this temperature constant the tank is supplied with one inlet, in the center of the bottom, and four outlet pipes, one on each side near the top. The temperature of the copper chamber is regulated by a simple electrical thermostat suspended in it, which will cut off or let on a supply of liquid or water entering the tank as the temperature requires.

In making a test or tests the samples are placed in position on the disk in the copper chamber, the cover with the apparatus put in place, and the chamber secured in the lead-lined tank. The water or liquid of the desired temperature is run into the tank, which is allowed to fill and run off by the overflow pipes. The entire apparatus is then leveled by leveling screws in the feet of the tank until the needle tube is perfectly vertical. When asphalt is to be tested it is for convenience put into small round tins like small blacking boxes. By heating just sufficiently to melt it a smooth surface is obtained with quite a gloss. These boxes containing the samples are placed on the revolving disk, each sample resting on two raised points on the surface of the disk, this giving them a slight incline. The table is then revolved until the desired sample is directly under the needle tube, when it is lowered until the needle is very nearly in contact with the surface. The surface of the sample being slightly inclined, it can be brought just in contact with the needle by a slight revolution of the disk. By arranging the mirror on top of the cover so that it will reflect the light from a window down upon one of the mirrors in the chamber—which in turn reflects it on the surface of the sample—and then having the other mirror in the chamber in such a position as to reflect the image of the sample up, the needle can be set accurately to the surface by watching its reflection in the surface of the sample. To determine the penetration the reading of the dial is taken, the clamp is released, which allows the needle to sink in the asphalt under the weight of the tube. The apparatus is so constructed that when the clamp is released from the tube another clamp closes on the thread of the counterbalance weight, thus preventing the plumb weight from falling and adding its weight to that of the tube. On clamping the tube again at the expiration of the desired time the thread of the counterweight is released, which allows the plumb weight to sink until it is checked by the top of the tube. The present reading of the dial, less that before taken, is the distance the needle penetrated into the sample. Readings can be made with accuracy to one-fiftieth millimeter.

Respectfully submitted.

A. W. Dow,
Inspector of Asphalts and Cements.

Capt. LANSING H. BEACH,
Corps of Engineers, U. S. A.,
Engineer Commissioner District of Columbia.

REPORT OF THE PERMIT CLERK.

WASHINGTON, August 8, 1898.

SIR: Permits issued during the fiscal year ended June 30, 1898, were:

Water connections	1,843	
Water repairs	857	
Water specials	276	
		2,976
Sewer connections	2,073	
Sewer repairs	1,023	
Sewer specials	361	
		3,457
Gas and electric light connections	959	
Gas and electric light repairs	187	
Gas and electric light specials	34	
		1,170

Lay gas mains	72
Lay and repair electric conduits	38
Erect and replace telegraph and telephone poles	129
Erect railings to inclose parkings	464
Alleys, close temporarily	2
Alleys, grade and fill	7
Alley, repair pavement	1
Alleys, excavate in	6
Bridges, haul loads of 6 tons and more over	13
Bridge, erect electrical fixtures on	1
Bridge, place over gutter	1
Bridge, place electric wires on	1
Bridge, renew floor	1
Bridge, remove floor temporarily	1
Cables, repair underground	4
Copings, erect and repair on parkings	52
Conduit, take up section (Chesapeake and Potomac Telephone Company)	1
Cellar door, adjust to grade of sidewalk	1
Curbs, reset	2
Carriage blocks, place on sidewalk at curb	3
Construction material, place on streets	2
Driveways, lay, repair, and remove	26
Drains, lay	8
Drains, repair	3
Down spout, connect to sewer lateral	1
Drilling machine, place on sidewalk	1
Engines, move traction by own power over roads	4
Engine, place pumping, on sidewalk	1
Excavate in streets	6
Flag, display by attaching to tree	1
Flag pole, erect	1
Fences, repair, renew, or replace	503
Fences, remove and reset	3
Fences, erect on parkings without fee	3
Guard stones, place in alleys	4
Gutter, dig	1
Gutter, clean and open	1
Hand-hole, build	1
Haul over sidewalks	22
Hitching posts, erect, straighten, and replace	17
Hedges, plant at fence line on parkings	3
Lamps, erect private electric	2
Lamp-post, erect for displaying coal-oil lamp	1
Manholes, remove cover (sewers)	4
Manholes, build on electric conduits	4
Manhole, remove from electric conduit	1
Manholes, enlarge on electric conduits	11
Material, take from unimproved streets	17
Material, fill in unimproved streets	16
Material, pile in streets (soil)	5
Material, deposit, in alley (ashes)	1
Overhead wires, make house connections	29
Overhead wires, string and renew with copper	39
Parking leads, lay	438
Parking leads, relay or repair	162
Parkings, erect steps on	35
Parkings, repair or replace steps on	77
Parkings, grade	69
Parkings, sod and plant flowers in	30
Parkings, pave over	62
Poles, place ground wires on	2
Pipe line, (oil) repair	1
Roadways, drive derrick pins in	2
Roadways, repair and grade	6
Rail welder, operate on streets	1
Sidewalks, lay	29
Sidewalks, repair	75
Sidewalk, grade	1
Sidewalk, make excavation in	1
Sewers, connect railroad conduits with	111

Sewers, connect electric conduits with.....	27
Sewer lateral, clear.....	1
Sewer lateral, relay.....	1
Sockets, place in sidewalk.....	2
Stopcock box, adjust to grade.....	1
Streets, repair.....	3
Street sweepings, store.....	1
Street, barricade.....	1
Snowplow, use horsepower on sidewalk.....	1
Steam rollers, move through streets.....	1
Trees, cut down.....	9
Trees, place guards around.....	2
Trees, whitewash.....	54
Tree spaces, extend.....	2
Tree spaces, pave.....	2
Tree spaces, sod.....	5
Tree boxes, paint.....	1
Vault door, enlarge in sidewalk.....	2
Vault door, replace.....	2
Walls, place on parkings (retaining).....	14
Walls, cement to prevent dampness.....	6
Water tables, build of cement on parkings.....	7
Wires, string and repair trolley.....	2
Walks, make temporary.....	1
Wharves, build and repair.....	2
Well, drive in parking.....	1
Well, construct in parking from sewer (United States Electric Lighting Co.).....	1

Railroad companies.

Baltimore and Ohio:	
Lay plank at street crossing.....	1
Straighten arc-light poles.....	1
Relay bridge flooring.....	1
Repair safety gates.....	1
Remove safety gates.....	1
Construct safety gates and build watch box.....	1
Brightwood Company:	
Put in switch and rearrange tracks.....	1
String feeder wire.....	1
Belt Company:	
Equip with air motors.....	1
Salt tracks for melting snow.....	1
Capital Company:	
Install Brown underground system.....	1
Install Brown system on Navy-Yard Bridge.....	1
Replace contact boxes.....	1
Extend time for trial of Brown system.....	2
Repair underground cable.....	1
Repair along line of tracks.....	1
Connect with testing station in Eleventh street southeast.....	1
Capital Traction Company:	
Remove cable machinery from vaults in streets.....	4
Install electric power.....	1
Place construction in streets.....	1
Weld rails in streets.....	1
Drive pins in roadway to draw in feed wires.....	1
Salt tracks for melting snow.....	1
Columbia Company:	
Remove cable from conduit of Capital Traction Company.....	1
Repair along line of tracks.....	1
Place paving material along line.....	1
Eckington and Soldiers' Home Company:	
Repair along line of tracks.....	1
Equip with air motors.....	1
Salt tracks for melting snow.....	1
Repair overhead trolley wires.....	1
String extra guywire.....	1
Georgetown and Tennallytown Company:	
Repair along line of track.....	1
Erect post and clock in front of car shed.....	1

Railroad companies—Continued.

Metropolitan Company:	
Lay temporary tracks to remove cars.....	1
Repair conduit.....	1
Pave along parking.....	1
Maryland and Washington Company:	
Salt tracks for melting snow.....	1
Philadelphia, Wilmington and Baltimore Company:	
Connect turntable pit with sewer.....	1
Erect watch bow.....	1
Pave over parking.....	1
Repair safety gates.....	1
Southern Company:	
Pave sidewalk with flagstones.....	1
Washington, Alexandria and Mount Vernon Company:	
Remove trees on Thirteen and-a-half street northwest.....	1
Washington and Great Falls Electric Company:	
Lay permanent cross over.....	1
Erect and string wires to operate block system.....	1
Alter overhead wires.....	1

United States Government.

Officer in charge of public buildings and grounds (Col. T. A. Bingham):	
Repair water, sewer, and gas mains and services.....	1
Replace telegraph pole.....	1
Lay underground conduit.....	1
Public Printer (Hon. F. W. Palmer):	
Construct conduit across Jackson alley.....	1
Repair water main.....	2
Erect telegraph pole.....	1
Secretary of War (Hon. R. A. Alger):	
Open street (excavation).....	1
Connect with sewer in square 169.....	1
Treasury Department:	
Repair sewer lateral.....	1
United States Commissioner of Fish and Fisheries:	
Repair sewer lateral.....	1
United States Navy-Yard:	
Connect with sewer.....	1
United States Marine Corps:	
Clean drain in sidewalk.....	1
Examine drain in sidewalk.....	1
Washington Aqueduct (Capt. D. D. Gaillard):	
Make borings, surveys, etc., Massachusetts avenue extended, at Rock Creek.....	1
String telephone wires.....	1
Grand total.....	10,465

There has been an increase in the number of permits issued as compared with the fiscal year ended June 30, 1897, and also in the amount of money received for permit fees, as shown by the report of the collector of taxes, District of Columbia, there being \$490 more than for the fiscal year 1896-97.

Permits issued during the fiscal year:

1896-97.....	10,155
1897-98.....	10,465

The following table shows the number of permits issued during the last five years and the amount of money paid the collector of taxes, District of Columbia, during that time:

Fiscal year.	Permits issued.	Fees paid.
1893-94.....	8,064	\$7,024
1894-95.....	8,740	7,229
1895-96.....	11,453	7,236
1896-97.....	10,155	7,355
1897-98.....	10,465	7,845

Six hundred and eighty-five communications have been referred to this office, entered in the letters-received book and on cards, permits written for the majority of them, the action noted, and their return to the record office of the engineer department of the District of Columbia, or through that office to the division having charge of the inspection of the work for which the permits were issued.

Three hundred and fifteen names have been recorded for positions as laborers on the different works of the District of Columbia during the fiscal year ended June 30, 1898.

The continued improvements of the roadways, and especially the sidewalks, replacing the brick with cement or granolithic, increases the work of the office. Plumbers, or other persons having permits to make excavations, must have stamped on the permit the kind of pavement to be cut. The employees of this office are required to know there is a deposit to the credit of the person to whom the permit is issued sufficient to pay the cost of repairs. The registered plumbers are required to make with the collector of taxes a deposit of \$25 before being granted a permit, and against this deposit is charged the cost of repairing cuts made by them. The location of all cuts is reported weekly to the computing engineer, and the repairs are made by employees of that division of the engineer department. Statement of costs of repairs is rendered monthly, each plumber being required to promptly deposit such amount with the collector of taxes as to bring his balance to \$25. Failure to make such additional deposit within five days after rendition of account prevents permits being issued him until he has again brought the funds to his credit up to \$25. Whenever application is made to make cuts in any improved streets, the estimated cost of the repair of which is more than \$25, the plumber must deposit a sufficient sum to make the amount of his credit equal to the estimated cost of doing the work, plus \$10, before the permit can be issued.

Care has to be exercised by the employees of this office to notify persons having permits to make excavations of the location of electric-light, telegraph, and telephone conduits in the roads, sidewalks, and alleys, to guard the cables therein from injury by the tools of the workmen making the excavation.

All permits to make excavations to connect with or repair underground constructions, erect parking fences, hitching posts along the inner edge of the curb, place carriage blocks of prescribed dimensions at the curb, etc., are issued from this office. With the exception of special permits allowed by the plumbing regulations or ordered by the Commissioners of the District of Columbia, a fee of \$1 is charged for each building, lot, premises, or establishment connected, and for each excavation made for repairing pipes or other underground structures, and for the erection or replacement of a pole or more than one pole. This fee is in all cases paid the collector of taxes of the District of Columbia and his receipt entered upon the application before the permit is issued, all other employees of the District of Columbia being prohibited from collecting or receiving, or in any manner being the medium for the transmission of funds of any kind whatever due or payable to the District of Columbia.

Very respectfully,

H. M. WOODWARD,
Permit Clerk.

Capt. LANSING H. BEACH,
Corps of Engineers, U. S. A.,
Engineer Commissioner District of Columbia.

FIRST DIVISION.

(Capt. EDWARD BURR,

Corps of Engineers, United States Army, Assistant to the Engineer Commissioner, in charge until April 28, 1898.)

WATER DISTRIBUTION.....	W. A. MCFARLAND, <i>Superintendent Water Department.</i>
WATER RATES	GEO. F. GREEN, <i>Water Registrar and Chief Clerk, Water Department.</i>
STREET LIGHTING	} W. C. ALLEN, <i>Inspector of Electric Lighting.</i>
ELECTRIC WIRES AND CONDUITS	
INSPECTION OF GAS AND METERS	S. CALVERT FORD, <i>Inspector of Gas and Meters.</i>
BUILDINGS AND BUILDING INSPECTION	J. B. BRADY, <i>Inspector of Buildings.</i>
	E. F. VERMILLION, <i>Inspector of Elevators.</i>
SURVEYOR'S OFFICE	WM. P. RICHARDS, <i>Surveyor, District of Columbia.</i>
PARKING COMMISSION	TRUEMAN LANHAM, <i>Superintendent of Parking.</i>

REPORT OF THE SUPERINTENDENT OF THE WATER DEPARTMENT.

WASHINGTON, July 21, 1898.

SIR: I have the honor to submit the following report on the work of the distribution branch of the District water department for the fiscal year ending June 30, 1898.

DISTRIBUTION SYSTEM.

The distribution system of the District is divided into three general parts: The low-service area, lying between tide level and an elevation of about 95 feet above tide, supplied by gravity; the middle service, covering a territory having an elevation varying from 95 to 210 feet above tide, supplied by direct pumping, and the high service, covering that part of the District having an elevation between 210 and 400 feet above tide, supplied by indirect pumping through the Fort Reno Reservoir, with a capacity of 4,500,000 gallons and a normal surface elevation of about 420 feet above mean tide.

The limits of the low-service area are indicated on the map herewith. From this it will be seen that practically all of the "city," or the area lying south of Florida avenue, is supplied by gravity. By reference to this same map the general arrangement of trunk mains (in which classification are included all sizes above 6 inches) will be readily understood. The higher areas both in the northwest and on Capitol Hill are, as indicated, supplied wholly through the 48-inch main, which is run as an independent line from the distributing reservoir. This arrangement was adopted in pursuance of an effort to maintain satisfactory pressures over these higher areas. This is partially effective, the heads being some 5 or 6 feet better over the area supplied by the 48-inch main than would be the case were all four supply mains cross connected. As will be shown later, however, the existing pressures over considerable areas are far from satisfactory.

SERVICE MAINS.

The size adopted for service mains on all streets and avenues is 6 inches; in the alleys short lengths of 4 and 3 inch pipe are used. The general arrangement is to lay a 6-inch main under the sidewalks or parking on each side of the wider and asphalt-paved streets, or a single main near the center of the narrower streets,

especially in the outskirts of the city. The two mains are, when practicable, brought into one at the street intersections and the four radiating lines controlled by a single four-stem four-way stop valve. Many variations from this general plan are, of course, necessary.

The maximum and minimum pressures at ground level on the several services are about as follows:

	Maximum.	Minimum.
Low	35	10
Middle	75	12
High	100	12

FIRE HYDRANTS.

The total number of fire hydrants in use is about 1,800, 75 having been erected during the past year. In general, one hydrant is placed near each street intersection, with intermediate locations where necessary. Each hydrant has a 6-inch standpipe 4 feet in length, and is provided with either two or three 2½-inch independent cut-off nozzles for fire hose.

The mean daily consumption and waste of Potomac water in the District of Columbia for the past year, as shown by the records of the Aqueduct office, is 47,288,733 gallons. Of this amount 42,506,620 gallons went to the low service, 4,656,000 gallons to the middle, and 121,113 gallons to the high. Estimated total population, 280,782; estimated number of water consumers, 264,302. Corresponding per capita rate for whole District, 168 gallons; corresponding per capita rate for every person using Potomac water, 179 gallons.

WATER WASTE.

A large number of tests and experiments have been made during the year for the purpose of further determining the cause, amount, and location of the enormous waste of water constantly going on. All evidence available goes to confirm the belief heretofore reached that the amount of water wasted considerably exceeds that usefully applied, and that of this waste a large amount occurs in private houses.

Authority has been given this department to meter municipal buildings, and under this authority all schoolhouses in the District have been permanently metered. Some of the results obtained by this action are indicated in one of the tables appended hereto.

Probably the most important results were obtained by the use of the "Deacon waste-water meters," three of which were installed in different parts of the city.

The "rate" in gallons per hour at which water is flowing through this meter is automatically recorded on a graduated chart, ordinates representing rates of flow and abscissas time.

This meter having been placed on a main supplying a certain section, usually having a population of between 1,000 and 2,000, the valves on the boundary of this section are so manipulated that all water flowing into it must pass through the meter. If the service be wholly domestic all flow between the hours of midnight and 4 a. m. is considered waste.

Therefore by this arrangement we get—

First. The rate at which water is supplied to the whole section and the rate of waste.

Second. By cutting out one block at a time, the rate of waste on this particular block.

Third. By shutting off at curb cock the flow to each house, the waste here, if any.

Fourth. All remaining flow must be due to leakages in valves or mains and is not chargeable against the water consumers.

In this way a complete analysis has been made in several parts of the city.

In this connection attention is invited to the report of Mr. John Green, who has had charge of tests by Deacon meters.

Under the law (sec. 24, chap. 68, C. S. D. C.) directing that the supply of water to all manufacturing establishments, hotels, livery stables, and other places requiring a large quantity of water shall be determined by meters, etc., 906 meters, varying in size from one-half inch to 6 inches, have been installed and have without doubt somewhat curtailed waste. The amount collected for water through meter measurement during the year was \$38,989.59, or 14½ per cent of the total amount received. Only about 2 per cent of total number of water takers are supplied through meters.

The results obtained by the use of the Deacon meters, as summarized in Mr. Green's report, indicate the enormous wastes in private houses which do undoubtedly result from defective plumbing, carelessness, and wilful violation of regula-

tions. The only practicable remedy for this evil is the payment for water actually used or wasted on each premises, to be determined by meter measurement. In support of this proposition I would refer to the very able and complete argument presented by Capt. Edw. Burr, then assistant to the Engineer Commissioner, in the last annual report of the engineer department. The following extract is from that report:

"That the general introduction of meters will accomplish this end without hardship, increased cost to consumers, insanitary conditions, or any curtailment of the proper use of water there can be no doubt. The opinion of all authorities and the experience of all communities where the meter system has been generally introduced leads to this belief. By the use of meters is obtained a suppression of waste, a uniformity of water rates according to the amount of water used or wasted, and an increase of pressure, with a general improvement of the service without the expenditure of large sums for enlargements of works.

"To illustrate the benefits of the meter system it is necessary to refer to but one city, Detroit, with about the same population as the District of Columbia. The following quotations are taken from a statement made by Mr. L. N. Case, superintendent of the Detroit waterworks, before a committee of the legislature of the State of Michigan, having under consideration what is known as the 'free water bill' for Detroit:

"There has been found but one really efficient restriction to waste, and that is the meter, although assessing upon the basis of consumption as estimated is partially so. * * *

"For years, and up to 1889, Detroit, Buffalo, and Philadelphia operated upon the assessment plan entirely. Detroit pumped a daily per capita supply of 204 gallons. Our capacity was more than exhausted, and complaints of short supplies were bitter and increasing. March 6, 1889, I demonstrated to the board that meters must be used to stop this enormous waste or an enlargement of the works entered into immediately at an estimated expense of \$600,000. The introduction of meters was decided upon. The following conditions of the three cities in 1887 and 1896 will show the results of the introduction of meters in Detroit and the continuance of the old method in Buffalo and Philadelphia:

"Daily pumpage in million gallons.

	Buffalo.	Philadel- phia.	Detroit.
1887	38	88	36
1896	101	236	36
Increase in population.....per cent..	84	46	56

"Detroit, at the same rate of increase of Buffalo and Philadelphia, which corresponded exactly with her increase previous to using meters, would have pumped 101,000,000 gallons daily. This would have required an expenditure of over \$200,000 for engines and pipes more than was expended, and an extra expense for pumping water of \$94,900 for last year, with a proportionate increase for the intervening years. * * *

"One-third increased pressures."

"The result in Detroit is a stationary total consumption for ten years, with a 56 per cent increase in population and a per capita decrease from 203 to 130 gallons. This was accomplished by metering about 5,000 consumers of a total of 49,000, and, while the effect is marked, the per capita supply still shows large waste that can be reduced by increasing the number of meters.

"In this city (Washington) the increase in the use of meters has produced a similar but not less marked effect. The existing law requires the use of meters only by hotels, livery stables, manufacturing establishments, and other large consumers. Since 1894 all such consumers have been required to use meters. The following table shows the result:

	1894.	1895.	1896.	1897.
Number of premises supplied	44, 185	45, 675	46, 908	48, 540
Number of meters	202	231	574	777
Water supplied.....gallons..	49, 162, 000	47, 182, 000	44, 114, 000	45, 267, 000
Per capita.....do.....	181	173	165	164

"With an increase since 1894 of 4,355 in the number of premises supplied with water the total daily supply is reduced by about 4,000,000 gallons, and the per capita supply from 181 to 164 gallons. This can be attributed to no other cause than the metering of about 500 large consumers of the character mentioned above.

"As the law now stands no further extension of the meter system can be made, since all premises excepting dwellings and small shops are metered. To further curtail waste, meters must be gradually applied to all consumers. It is the current belief that the excessive consumption here arises from large use and waste of water in the United States buildings and grounds. While undoubtedly there is some waste in the departmental buildings, there are good grounds for believing that it is very much less than suspected, and that the waste is largely due to defective plumbing, and wilful, deliberate, or careless waste in dwellings. The high service, as above stated, supplies a purely residential section, composed largely of modern houses, and served through comparatively new mains and services. The natural expectations would be for a smaller rate of waste than for the whole city. On the contrary the percentage of waste, as shown by the water supplied from midnight to 4 a. m., is noticeably larger than for the low service containing the business section, and a much larger proportion of older houses, plumbing, services, and mains. The unavoidable conclusion is that there is more waste in the residential section and in dwellings than in business or commercial premises, and that the United States departments, though, as stated earlier, entitled by law to use or waste as much water as they desire, in fact do not waste as much or at the same rate as the resident population.

"This waste can be reached and corrected only by meters. House-to-house inspection has been found to avail little, besides being extremely offensive to citizens. It has been found impracticable to correct leaks and waste except by cutting off the water, a very harsh measure, and only to be resorted to in exceptional cases. It is the numerous but very small leaks that cause the great waste, and to cut off the water for such would entail many hardships and bitter complaints.

"The water meter makes each householder an inspector of the most effective kind, besides detecting leaks unknown to the consumer and not to be found by an inspector. An instance will illustrate: The second quarterly bill rendered after placing the meter in a hotel in this city produced vigorous complaint of excessive charge and of incorrect meter. After retesting the meter to satisfy the consumer, a series of all-night readings showed such a large midnight registration as to indicate a large waste. With some difficulty the waste was located, and the average daily use was reduced from 53,800 to 32,400 gallons. Without doubt water is wasting in many similar cases of hidden leaks without the slightest benefit to anyone, and such wastes will continue until the use of the meter makes it to the interest of the consumers to seek out and correct their causes.

"From other points of view the use of the meter is desirable or necessary. It is not practicable or possible to so rate by any scheme of assessment as to charge each consumer, even approximately, correctly for the amount of water used. All assessment or flat rates are based upon the size of the building, number and character of fixtures, number of occupants, or some similar data. The amount of water used does not necessarily bear any relation to any of these, and the waste of water certainly does not. It is inconsistent and unjust to rate a modern house, with first-class plumbing and no appreciable waste, on the same basis as a rookery with fixtures leaking continuously and left to run every cold winter night to avoid the freezing of exposed pipes. And yet all assessment schedules give two such houses the same rating, provided they are of the same size or comply equally with some other arbitrary requirement. Such conditions exist in every city. Every assessment schedule bears inequitably and gives rise to many complaints that can be met only by one answer—by the meter system, and no other; consumers pay for what they use and waste, neither more nor less. The sale of water should be conducted upon the same sound business principles as govern the sale of gas, provisions, or any other commodity, bearing in mind always that the proper use of water is to be encouraged. To deliver water throughout a city requires large expenditure. It can never be free, but must be paid for in one way or another, and there is neither justice nor sense in compelling one householder to pay for more than he uses in order that his extravagant, careless, or law-breaking neighbor may pay for less than he uses and wastes."

A number of hydraulic elevators, driven by direct pressure from the middle service mains, have been built during the past year. Water supplied is paid for by measurement, the amount used being recorded by registers attached to the elevator gears.

Owing to trouble resulting from water ram, caused by the quick opening and closing of operating valves on these elevators, an independent main was laid connecting two of the elevators on Fourteenth street with the 24-inch trunk line in Thirteenth street. Since this was done no complaints have been received.

DEFECTIVE PRESSURES.

Many well-founded complaints of insufficient pressure on the low-service area have been received during the year. In most cases relief was impossible.

In a few cases an extension of the middle service was made. On the map herewith are indicated the locations where the water pressure at the curb level is less than 20 pounds per square inch.

This trouble has been increasing from year to year, and no marked improvement can be expected until the supply is re-enforced from the north by putting in use the Howard University reservoir.

It is believed that the completion of this work, which now seems assured, will practically eliminate the trouble from defective pressure, unless the waste of water, already beyond reason, should be much increased.

In this connection it may be well to consider here the ultimate capacity of the existing works. This capacity, as determined experimentally in 1897 by Capt. D. D. Gaillard, Corps of Engineers, U. S. A., is 76,500,000 United States gallons in twenty-four hours. It has been found in the past that an increase of available pressure in the mains results in a marked increase in the number of gallons used per capita per diem. Almost immediately on the completion of the 48-inch main, completed in 1890 for the relief of the city, this rate rose to 181.

When the Howard University reservoir is completed and put in use the increase in available head will be much greater than that resulting from the 48-inch main above referred to; and unless radical measures be adopted to decrease the waste of water it would seem necessary to assume a per capita of at least 180. At this rate the ultimate capacity of the existing works would be reached when the population of the District had increased to 425,000.

Assuming 200 gallons per capita, this condition would be reached with a population of 382,500.

The completion of the Howard University reservoir and tunnel is not only absolutely necessary, if satisfactory pressures are to be established over the higher parts of the areas supplied by gravity flow, but the value of the increase in storage volume from 300,000,000 to 600,000,000 gallons is evident.

In case of serious accident to the conduit or head works, or, still worse, to the trunk mains connecting the distributing reservoir and the distribution system of the city, this extra supply of water would be of incalculable value. Under present conditions if for any reason the flow through the four trunk mains entering the city should be interrupted the entire District, except a small part of the high service area, would at once be without water for domestic use or protection from fire. The possibility of this condition arising is increased by the fact that for nearly the whole distance from the distributing reservoir to Rock Creek, about 2 miles, the four mains lie side by side under the same roadway.

PUMPING STATION.

No material changes have been made in the machinery at the U street pumping station since the last annual report was submitted.

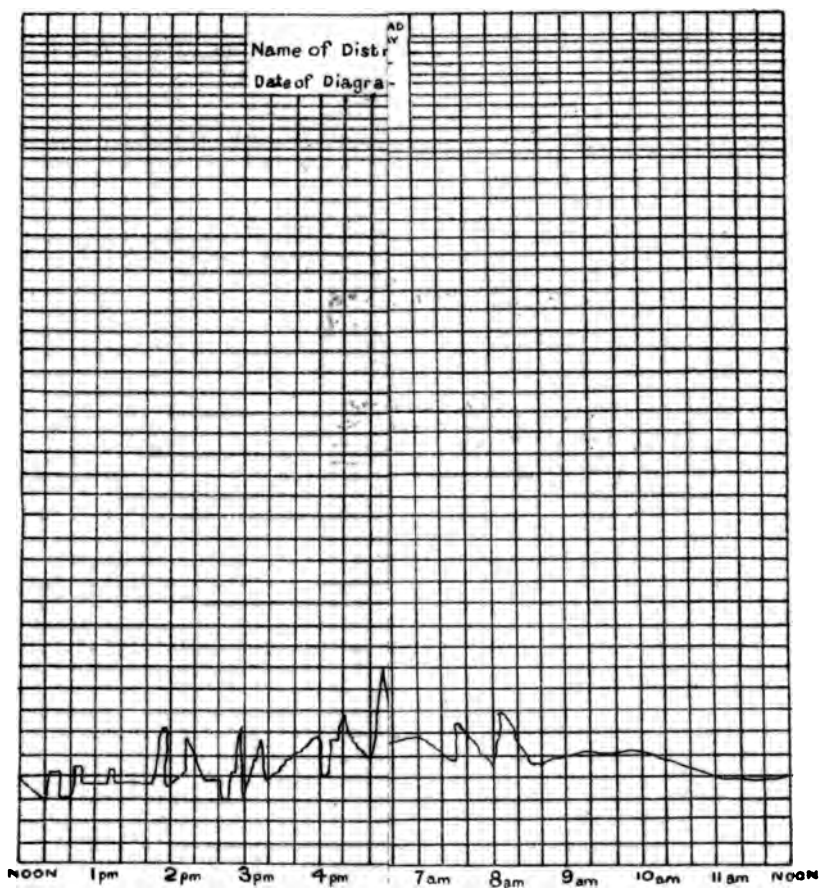
Smaller plungers were placed in the old "Gaskill" pumping engine, reducing its capacity from 2,500,000 to 1,200,000 gallons per day, and connections were made for running this pump on the "high" service. Owing to two serious breaks in the discharge main inside of the pumping station the pump was so used for only a few days and is now idle, pending the arrival of new and heavier special castings.

After several unsuccessful attempts the ten-day acceptance test of the new 8,000,000 gallon pumping engine was completed. Following is a summary of principal results:

[Date, March 11-21, 1898.]

Duration	days..	10
Mean daily discharge of pumps, plunger displacement	gallons..	8, 140, 000
Mean pressure on suction main	pounds per square inch..	6.74
Mean pressure on discharge main	do.....	95.79
Mean net pressure	do.....	89.05
Mean coal burned per day, containing 2½ per cent of moisture, pounds		11, 309
Total revolutions of engine		540, 680
Duty per 100 pounds of coal actually fired		123, 405, 000
Moist coal burned per hour	pounds..	471
Per cent moisture		2½
Dry coal per hour	pounds..	459
Per cent ashes		7.2
Combustible per hour		425
Total foot-pounds of work during test, based on plunger displacement, net water pressure, and revolutions		139, 558, 800, 000
Mean effective horsepower		293.7
Mean indicated horsepower		323.8
Moist coal per indicated horsepower per hour		1.455
Dry coal per indicated horsepower per hour		1.417
Combustible per indicated horsepower per hour		1.312

DIAGRAM No.1



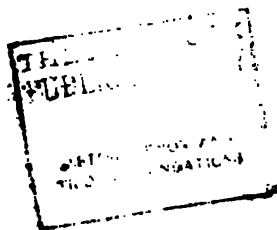
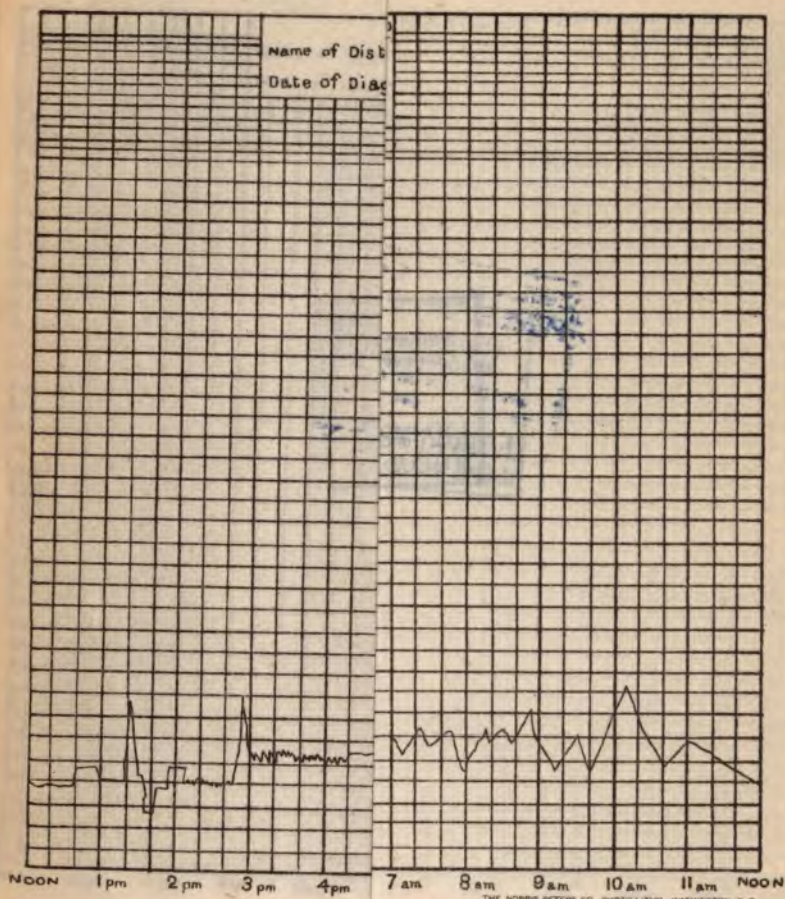


DIAGRAM No.2



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M.

r the terms of the contract the builders earned a bonus of \$3,450 for excess

was also conducted a series of duty trials under ordinary service conditions to determine the relative economy of five different kinds of bituminous coals, and a report of results submitted.

daily pumpage for year	gallons..	4, 656, 000
hourly	do.....	194, 000
am daily	do.....	5, 614, 500
am daily	do.....	3, 984, 000
am hourly	do.....	351, 000
am hourly	do.....	130, 500

water pumped is now drawn from the 48-inch main on R street through a 20-inch main about 1,800 feet long. At the maximum rate per hour given above, a flow of 100 feet per second must be maintained. To avoid serious loss of head an increase in capacity of the suction main will be necessary in the near future.

The necessity for a reservoir of ample size on the middle service is becoming more and more evident. During some hours of June the pumping was at the rate of over 100 gallons per hour. As the rated capacity of our largest engine is but 100 gallons per day and of the reserve but 7,000,000, the trouble which might result from any derangement of these pumps is evident. There is always a chance of derangement, and with the direct system now in use a water famine in the parts of the city would be the immediate result.

A reservoir would not only overcome this difficulty, but would result indirectly in reduced pressures over the higher parts of the low-service area. As the pumps now supply direct from the low-service mains, the maximum draft on these mains to supply the middle service now necessarily occurs during the hours of greatest consumption. With a reservoir the hours of maximum pumping could be shifted to occur during the hours of least consumption, thus tending to equalize pressures.

Improvements have been made in and about the pumping station. A new pump yard in the rear of the old one has been bought and inclosed by a 9-foot wall and the department stable has been doubled in size. The machine shop is continued in use, making a large number of minor repairs to machinery, engines, pumps, etc.

Transmitted herewith are a number of tables, which are self-explanatory.

In connection I would invite attention to the fact that the cost of laying mains as shown in Table IV, has again been reduced—the 3-inch from 0.5688 to 0.5375 per foot; the 4-inch from 0.6300 to 0.5679 per foot; the 6-inch from 0.7579 to 0.6745 per foot, and the 12-inch from 1.3086 to 1.2423 per foot.

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Under test conditions, with a somewhat better grade of coal, the amount burned per effective horsepower per hour was 1.6 pounds.

Under the total horsepower is the work done by a 10 by 16 by 7 by 12 compound duplex, condensing, direct-acting pump, working against a head of 300 feet. The amount of coal used by this pump is not known, but that the general efficiency of the plant is much reduced by it is certain. It is this pump which is to be replaced by the compound, high-duty "Gaskill" engine when pipe connections are completed.

In conclusion, I wish to record my appreciation of the efficient work done by the employees of the department.

Very respectfully, your obedient servant,

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Corps of Engineers, U. S. A.,
Engineer Commissioner District of Columbia.

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Minimum hourly	do.....	194, 000
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Engineer Commissioner District of Columbia.

TABLE I.—Summary of the distribution system.

	In service prior to June 30, 1897.	Added during the fiscal year.	Total June 30, 1898.
	<i>Linear feet.</i>	<i>Linear feet.</i>	<i>Linear feet.</i>
75 inches diameter	660		660
48 inches diameter	30,000		30,000
36 inches diameter	23,180		23,180
30 inches diameter	37,720		37,720
24 inches diameter	21,510		21,510
20 inches diameter	33,170		33,170
16 inches diameter	2,460		2,460
12 inches diameter	182,442.3	7,697.7	190,140
10 inches diameter	10,255		10,255
Total trunk mains.....			349,095
8 inches diameter	5,098	907	6,005
6 inches diameter	1,239,468.4	52,371.6	1,291,840
4 inches diameter	114,826.8	6,735.2	121,562
3 inches diameter	52,892.6	2,790.4	55,683
2 inches diameter	2,389.3	1,632.7	4,022
1½ inches diameter	2,070	500	2,570
Total.....			1,481,682
Grand total	1,758,142.4	72,634.6	1,830,777
	<i>Number.</i>	<i>Number.</i>	<i>Number.</i>
Stop valves	3,287	271	3,538
Fire hydrants	1,807	75	1,882
Public hydrants	329	11	a 331
Service connections	44,936	33	44,969
Taps	59,232	1,872	61,104
Public wells, deep driven	21	10	31
Public wells, shallow	134		b 123
Horse fountains.....	73	3	76

a Nine public hydrants abandoned.

b Eleven wells filled.

TABLE II.—Statement showing costs of water mains laid during fiscal year ending June 30, 1898.

Street.	Streets between—	Size.	Length.	Cost of material.	Cost of labor.	Total cost.
		<i>Inches.</i>	<i>Lin. feet.</i>			
Center Thirteenth, Brookland.	Milwaukee and Newark ...	1½	450	\$46.69	\$60.75	\$107.44
North side Milwaukee, Brookland.	East from Fifteenth	1½	50	2.75	11.60	14.35
Center Philadelphia, Brookland.	*Thirteenth and Fourteenth	2	717.7	98.57	59.81	158.38
Center Fifteenth NW.	North from Kenesaw ave- nue.	2	298	32.83	42.68	75.51
Center Eighteenth.....	A SE. and A NE.....	2	617	69.40	98.76	168.16
Huntoon court SW	Four-and-a-half and Union, N and O.	3	313	81.59	115.54	197.13
Alley, reservation 10.....		3	223.9	112.95	116.60	229.55
Alley, square 624.....		3	201	57.45	68.98	126.43
Alley, square 442.....		3	85.5	46.80	51.38	98.18
Alley, square 515.....		3	334.4	95.31	119.91	215.22
Alley, square 512.....		3	220.3	52.50	81.89	133.89
Alley, square 510.....		3	253.3	125.95	166.84	292.79
Alley, square 435.....		3	425	123.42	123.65	247.07
Alley, square 556.....		3	435.5	62.12	163.81	225.43
Alley, square 445.....		4	150.3	86.44	100.04	186.48
Alley, square 571.....		4	353.8	107.24	98.76	206.04
Alley, square 378.....		4	231	106.85	93.61	209.46
Alley, square 14.....		4	416.8	153.63	162.32	315.95
Alley, square 51.....		4	340	121.53	105.42	226.95
Alley, square 445.....		4	104.9	19.70	42.82	a 62.52
Alley, square 786.....		4	298	82.31	108.54	190.85
Alley, square 785.....		4	48.4	13.28	16.08	29.36
Alley, square 536.....		4	186.8	64.18	60.45	124.63
Alley, square 252.....		4	716	222.73	249.12	471.85
Alley, square 909.....		4	321.8	99.79	92.29	192.08
Alley, square 569.....		4	394.7	113.35	79.19	192.54
Alley, square 571.....		4	249.1	67.38	72.04	139.43
Alley, square 449.....		4	817	132.45	108.26	240.71

a Half cost paid by applicant.

TABLE II.—Statement showing costs of water mains laid during fiscal year ending June 30, 1898—Continued.

Street.	Streets between—	Size.	Length.	Cost of material.	Cost of labor.	Total cost.
		<i>Inches.</i>	<i>Lin. feet.</i>			
Alley, square 448.....		4	579	\$163.03	\$192.86	\$355.89
Alley, square 467.....		4	557.7	158.15	190.81	348.96
Alley, square south of 104.....		4	493	86.87	92.74	179.61
Alley, reservation 11.....		4	204.8	61.70	75.11	136.81
Alley, Pleasant Plains.....	Fourteenth and Fifteenth, Kenesaw and Park.	4	219.5	86.84	52.41	139.25
North side Virginia avenue SE.....	Seventh and Eighth.....	6	347.9	133.91	68.59	202.50
West side Twenty-sixth NW.....	Pennsylvania avenue and M.	6	298.7	107.96	116.62	224.58
Center N SE.....	Ninth and Tenth.....	6	475.1	218.30	100.06	318.36
Crossing M SE.....	Intersection of Sixth.....	6	561.8	239.20	159.75	398.95
Center Trinidad avenue NE.....	Levis and King.....	6	412.2	211.08	57.69	268.77
South side U NW.....	East from Le Droit avenue.	6				
Center Omaha.....	New Hampshire and Eighth.	6				
Center Eighth.....	Omaha and Trenton.....	6	3,335.5	1,385.58	668.02	2,053.60
Center Savannah.....	Eighth and Kansas avenue.	6				
Center Trenton.....	do.....	6				
East side Kansas avenue, Petworth.....	Savannah and Trenton.....	6				
Center Oak NW.....	Harewood and Linden.....	6	449	169.41	89.50	258.91
East side Sixth NE.....	T and Seaton.....	6	536	261.18	160.70	421.88
Center Seaton NE.....	East from Sixth.....	6	392.5	122.37	116.63	239.00
West side North Capitol.....	Massachusetts avenue and G.	6	412.2	200.54	207.34	407.88
North side L NW.....	Nineteenth and Twentieth.	6	1,356.5	504.36	291.93	796.29
East side Columbia road.....	Eighteenth and Nineteenth.	6	191	105.69	74.05	179.74
North side C SE.....	South Capitol and New Jersey.	6	313.4	98.56	71.56	170.12
Center L SW.....	East from Third.....	6	540.8	214.61	90.87	305.48
East side Eighteenth NW.....	Columbia and Belmont.....	6				
South side Richmond.....	Illinois avenue and Rock Creek Church road.	6				
Center Third.....	Richmond and Quincy.....	6	2,420	926.13	403.36	1,329.49
Center Quincy.....	Third and Rock Creek Church road.	6				
West side Rock Creek Church road, Petworth.....	Richmond and Quincy.....	6				
South side M NW.....	Thirty-third and Thirty-sixth.	6	1,239.6	551.11	419.04	970.15
Center Sherman avenue.....	Farragut and Whitney....	6	669.5	270.60	177.50	448.10
North side M NW.....	Thirty-first and Thirty-second.	6	452.3	120.18	118.44	238.62
West side First SW.....	I and K.....	6	356.4	164.05	116.84	280.89
Center Pickford place NE.....	F and G.....	6	554.5	274.35	106.87	381.22
Center Sixth NE.....	H and I.....	6	360.5	115.36	68.31	183.67
Center Linden NW.....	Elm and Wilson.....	6	373.5	135.46	100.22	235.68
West side Twelfth SE.....	A and B.....	6	569.5	217.93	127.07	345.00
North side Prospect NW.....	Thirty-sixth and Thirty-seventh.	6	305.4	119.58	90.09	209.67
North and south sides New York avenue NW.....	Twenty-first and Twenty-second.	6	1,432.8	596.04	322.10	918.14
Center Emporia, Brookland.....	Thirteenth and Fourteenth.	6	661.5	257.94	86.50	344.44
Center Bates NW.....	North Capitol and First....	6	557.8	194.94	107.62	302.56
Center Erie, Brightwood Park.....	Eighth and Ninth.....	6	490.4	217.51	109.78	327.29
Center Concord, Brookland.....	Twelfth and Thirteenth....	6	660.3	260.93	154.04	414.97
Center Lincoln avenue.....	South from T.....	6	450	195.56	123.40	318.96
Center Grant, Mount Pleasant.....	School and Pine.....	6	574	161.01	107.26	268.27
Center Madison NW.....	M and N.....	6	523.9	320.59	255.59	576.51
	Thirty-second and Thirty-fifth.	6	217.1	124.32	96.57	220.89
East side Twenty-first NW.....	L and M.....	6	654.6	254.51	239.24	493.75
Center Third SW.....	C and D.....	6	218.6	110.03	104.61	214.64

a Half cost paid by applicant.

TABLE II.—Statement showing costs of water mains laid during fiscal year ending June 30, 1898—Continued.

Street.	Streets between—	Size.	Length.	Cost of material	Cost of labor.	Total cost.
		<i>Inches.</i>	<i>Lin. feet.</i>			
Center Nineteenth.....	Columbia and Kalorama.....	6	990.4	\$447.83	\$263.34	\$701.17
North side Kalorama avenue.	Nineteenth and Twentieth.....					
Center Twentieth NW.	North from Kalorama.....					
West side Third SW ..	L and M.....	6	373.7	149.29	84.98	234.27
Center Sixteenth NW.	North from Kenesaw avenue.	6	264.2	157.92	71.24	229.16
Center Breed's Terrace.	Mount Pleasant	6	317	131.19	67.50	198.69
East side Eighteenth NW.	Columbia and Kalorama avenue.	6	532.6	159.03	111.17	270.20
Center Tenth NE.....	H and I.....	6	366.3	110.31	78.32	188.63
Center Twelfth, Brookland.	North from Detroit.....	6	145.4	74.08	31.79	105.87
Center Piney Branch road.	North from Howard avenue.	6	177	67.56	55.33	122.89
North side M NW.....	Thirty-third and Thirty-fourth.	6	550	320.51	199.54	520.05
Center Eslin NW.....	Lamar and Spring road....	6	273	97.74	79.41	177.15
Center Howard court NW.	Oak and Wilson	6	192.6	97.13	61.75	158.88
North side E NW	Twenty-third and Twenty-fourth.	6	347	161.64	116.54	278.18
South side D SE	New Jersey avenue and South Capitol.	6	369	144.68	228.44	373.12
West side First SE.....	L and M.....	6	336	119.07	115.45	234.52
North side Q NW	Eighth and Ninth	6	261	124.52	122.43	246.95
Hanover court NW.....	North Capitol and First ..	6	135	56.49	33.00	89.49
Center Tenth Richmond, Petworth.	Eighth and Brightwood avenue.	6	557	210.18	104.62	314.80
East side North Capitol.	Randolph and S	6	415.7	311.46	132.22	443.68
Center Twenty-second NW.	E and Decatur.....	6	225.6	87.14	52.58	139.72
Alley, square 628 .....	.....	6	181	99.94	72.40	172.34
East side Delaware avenue.	F and G	6	510	316.11	197.91	514.02
Center F SW.....	First and Delaware avenue.					
West side First NW	E and F					
South side Newark.....	New Hampshire and Seventh.	6	686	339.18	161.84	501.02
Center Seventh, Petworth.	Newark and Rock Creek Church road.					
West side Sixth NE.....	B and C					
North side F.....	First and Second	6	844	368.93	182.18	551.11
East side First SE.....	F and Heckman					
Center Joliet, Brookland.	Twelfth and Fourteenth....					
Center Hartford, Brookland.	East from Thirteenth	6	79	38.49	20.85	59.34
Center Fifth NW.....	Pomeroy and Wilson	6	368.7	200.64	95.16	295.80
Center Elm NW.....	Larch and Linden	6	845.5	104.50	81.83	186.33
Center Marshall NW..	Sherman and Brightwood avenues.	6	864.5	333.79	176.83	510.62
Center Sherman avenue NW.	Farragut and Marshall	6	315	116.98	59.27	176.25
Center California avenue NW.	East from Phelps.....	6	117	103.57	44.94	148.51
Center Thirteenth NW.	Kenesaw and Kenyon	6	373	173.97	88.76	262.73
Center Sixth NW	Lincoln and Howard avenue.	6	687.6	207.80	137.98	345.78
Center Wallach NW ..	Thirteenth and Sherman avenue.	6	133	54.54	39.71	94.25
North side Wyoming avenue NW.	Columbia road and Connecticut avenue. "	6	671.4	403.07	246.42	649.49
Center Austin.....	Armesleigh Park.....	6	1,025.5	437.83	201.02	638.85
Center Thirty-ninth.	.....do.....					
East and west sides Thirty-sixth.	O and P					
South side P NW.....	Thirty-fifth and Thirty-sixth.	6	1,127	548.39	283.91	832.30
North side G NE.....	North Capitol and First....	6	553	234.97	198.98	432.95
Alley, square 677 .....	.....	6	229.6	113.84	105.78	219.62
South side Massachusetts avenue NW.	Twentieth and Twenty-first.					
South side Pennsylvania avenue NW.	West from Ninth					
West side Ninth SE....	Pennsylvania avenue and E	6	431.6	176.12	138.17	314.29
South side R NW.....	Third and Fourth	6	236.9	81.07	66.42	147.49
Center Omaha, Brookland.	East from Twelfth	6	189.5	70.15	38.45	108.60

EX II.—Statement showing costs of water mains laid during fiscal year ending June 30, 1898—Continued.

Street.	Streets between—	Size.	Length.	Cost of material.	Cost of labor.	Total cost.
		<i>Inches.</i>	<i>Lin. feet.</i>			
side Clifton NW.	Thirteenth and Fourteenth	6	722.3	\$329.96	\$302.79	\$632.75
r C SE.....	Eighth and Ninth	6	343.8	112.44	92.75	205.19
side First SE.....	G and Canal.	6	100.2	73.46	47.98	121.44
r O NW.....	North Capitol and First ...	6	818.9	242.29	129.00	371.29
r Twentieth NW.	Wyoming and Kalorama...	6	396.8	188.28	105.94	294.22
side Center.....	Breed's Terrace and Fourteenth-street road.	6	300	89.58	72.94	162.52
side Massachu-	West from Twenty-third ..	6	522.9	193.14	148.52	309.66
s avenue NW.						
side O NW.....	Thirty-sixth and Thirty-seventh.	6	301.5	123.57	122.91	246.48
side Delaware	L and M.....	6	391.5	136.94	112.60	239.54
ue SW.						
r Twentieth NW.	South from E.....	6	193	70.04	67.89	137.93
side First SW....	M and N.....	6	673.4	261.62	197.77	459.39
side Fourteenth	Clifton to Roanoke	12	496	489.19	203.30	692.49
side Princeton	Thirteenth and Fourteenth	12	767.7	808.12	341.64	1,149.76
r Illinois avenue,	Richmond and Flint.....	12	6,434	6,031.89	1,425.31	7,457.20
worth.						
<i>Connections, valves, blow-offs, etc.</i>						
d between M and N SW., and Delaware ave-						
between M and N SW		3	157.2	77.88	77.88	155.76
ur place between North Capitol and First						
(valve)		3	3	14.88	15.56	30.44
e 753 (valve).....		3	15	63.76	66.10	129.86
e 636 (blow-off).....		3	3	10.89	10.25	21.14
s court (blow-off).....		3	3	12.53	5.88	18.41
y-second and N NW. (valve)		4	2	11.90	9.77	21.67
eenth and K NW		4	110	81.81	61.14	142.95
teenth and Willard NW		6	16.5	28.52	42.26	70.78
eenth and B NE.....		6	43	12.97	18.82	31.79
Capitol and C.....		6	91.6	108.74	50.32	167.06
side Sixteenth between T and U NW (valve) .		6	4	37.60	26.88	64.48
n and Pomeroy NW (valve)		6	2	19.49	13.43	32.92
side Sixteenth between S and T NW (valve) ..		6	116	84.25	73.01	157.26
side Sixteenth between T and Pierce NW						
ve)		6	6	82.62	22.46	105.08
wood and Spruce NW (valve).....		6	5	55.69	6.60	62.29
side Sixteenth between T and U NW (valve) ..		6	2	17.05	7.00	24.05
ween Eleventh and Twelfth NE.....		6	3	15.17	12.75	27.92
eenth between Q and R NW		6	33	53.23	42.81	96.04
ring mains					289.56	289.56
ished mains June 30, 1897.....				2.50	330.48	332.98
Total				30,600.24	18,684.00	49,284.24
of laying mains, connections, etc., including repairs to improved						
ements				30,600.24	18,684.00	49,284.24
of erecting fire hydrants, including repairs to improved pave-						
nts				4,068.46	1,126.65	5,195.11
of superintendence and engineering					3,184.29	3,184.29
Total				34,668.70	22,994.94	57,663.64

.04 per cent should be added to the cost of labor to attain the actual amount expended for labor, intendence, and engineering.

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TABLE III.—Statement of the lengths and cost of water mains laid from July 1, 1878, to June 30, 1898.

Fiscal year.	36-inch.	24-inch.	20-inch.	16-inch.	12-inch.	10-inch.	8-inch.
	<i>Lin. feet.</i>	<i>Lin. feet.</i>	<i>Lin. feet.</i>	<i>Lin. feet.</i>	<i>Lin. feet.</i>	<i>Lin. feet.</i>	<i>Lin. feet.</i>
1877	39.5				3,719		
1879					7,409		
1880							
1881							
1882							
1883					1,625		26
1884					1,038		
1885					963		
1886					1,938	791	
1887			a 4,835		b 1,124	c 2,998	
1888					731		
1889		2,312	5,140		5,626	2,784	
1890							
1891					c 5,201		
1892			2,926	2,500	e 10,163		
1893					6,473		
1894			278		39,386		
1895		6,617			27,731		
1896		294	8,874		11,873		
1897			2,180		6,877		
1898					7,698		i 907
Total	39.5	9,223	24,233	2,500	139,575	6,573	933

Fiscal year.	6-inch.	4-inch.	3-inch.	2-inch.	1½-inch.	Total.	Cost.
	<i>Lin. feet.</i>	<i>Lin. feet.</i>	<i>Lin. feet.</i>	<i>Lin. feet.</i>	<i>Lin. feet.</i>	<i>Lin. feet.</i>	
1878	12,781	30				12,811	\$14,846.20
1879	8,516	1,397				9,913	19,436.03
1880	d 3,024					3,024	
1881	e 3,709					3,709	3,110.70
1882	1,920					1,920	1,626.43
1883	4,084					4,084	8,073.70
1884	8,972					8,972	10,492.51
1885	27,766	358	485			28,549	25,865.35
1886	35,192		6,623			41,815	40,025.10
1887	30,041	292	7,124			37,457	56,951.00
1888	9,123	9,143	3,937			22,203	17,626.63
1889	36,742	6,571	8,753			52,066	79,342.16
1890	c 34,737	e 2,856	2,855			40,448	19,113.54
1891	e 56,893	e 3,142	e 11,013			71,048	49,702.65
1892	e 88,709.5	e 3,342	1,286			93,337.5	74,733.04
1893	e 54,173.5	e 8,336.5	e 3,458.5			65,968.5	56,339.39
1894	e 66,632.5	12,832	2,918.5			82,383	126,599.55
1895	f 103,785.5	5,442	f 2,733			111,960.5	134,502.31
1896	g 61,464.5	g 1,738	g 3,262.5			66,465	89,395.12
1897	h 71,266.5	h 10,595	992.5		2,104	84,959	77,954.81
1898	i 52,371.5	i 6,735	i 2,790.5	1,633	i 500	63,990.5	48,661.70
Total	791,903.5	72,814.5	58,231.5	1,633	2,604	1,110,263	954,397.92

a Cost of laying intersections not included herein.

b 1,074 feet laid to Congressional Library, cost not included herein.

c 45,246 feet laid under permit system, cost not included herein.

d Laid on Road street, Georgetown, to replace old cement pipe.

e 434 feet laid under permit system, and 1,939 feet used for connections to fire hydrants, cost not included herein.

f 14,790 feet laid under permit system, and 3,406 feet used for connections to fire hydrants, cost not included herein.

g 18,199.55 feet laid under permit system, and 1,004 feet used for connections to fire hydrants, cost not included herein.

h 1,837 feet of 6-inch and 3,656 feet of 4-inch laid under permit system, and 696 feet used for connections to fire hydrants, cost not included herein.

i 907 feet of 8-inch, 3,480 feet of 6-inch, 389 feet of 4-inch, 107 feet of 3-inch, 146 feet of 1½-inch laid under permit system, and 1,305 feet used for connections to fire hydrants, cost not included herein.

TABLE IV.—Average cost per foot for laying mains of various sizes during the fiscal year 1897-98.

Size.	Linear feet.	Cost of material.	Cost of labor.	Cost of superintendence and engineering.	Total cost.
1½ inch diameter	500	\$0.0988	\$0.1447	\$0.0245	\$0.2680
2 inches diameter	1,632.7	.1536	.1232	.0210	.2978
3 inches diameter	2,541.9	.2422	.2523	.0430	.5375
4 inches diameter	6,077.7	.2879	.2385	.0408	.5670
6 inches diameter	46,736.5	.4012	.2335	.0398	.6745
12 inches diameter	7,697.7	.9490	.2500	.0427	1.2423

TABLE V.—Average cost per foot for relaying pavements during the fiscal year 1897-98.

Size.	Cobble.		Brick.		Belgian.		Asphalt blocks.		Sheet asphalt.	
	Linear feet.	Cost.	Linear feet.	Cost.	Linear feet.	Cost.	Linear feet.	Cost.	Linear feet.	Cost.
3-inch	761	\$0.12			91	\$0.65	292	\$0.60	148	\$0.79
4-inch	1,447	.13	135	\$0.12			71	.47	353	.71
6-inch	1,869	.18	4,965	.14	266	.55	255	.59	1,369	.63
12-inch			451	.85						

TABLE VI.—Average daily consumption, middle service.

Month.	Gallons.	Month.	Gallons.
1897.		1898.	
July	3,742,640	January	4,390,000
August	4,980,580	February	4,442,540
September	4,791,000	March	5,570,000
October	4,276,800	April	4,300,000
November	4,201,360	May	4,156,600
December	5,027,450	June	4,804,750

TABLE VII.—Average daily consumption, high service.

Month.	Gallons.	Month.	Gallons.
1897.		1898.	
July	123,030	January	116,380
August	100,250	February	130,000
September	150,800	March	109,320
October	108,190	April	128,900
November	75,970	May	114,400
December	138,640	June	217,480

TABLE VIII.—Statement of the lengths and costs of water mains laid under the appropriation for the extension of the high-service system of water distribution from July 1, 1893.

Fiscal year.	24-inch.	20-inch.	12-inch.	6-inch.	4-inch.	2-inch.	1½-inch.	Total.	Cost.
	Lin. feet.	Lin. feet.	Lin. feet.	Lin. feet.	Lin. feet.	Lin. feet.	Lin. feet.	Lin. feet.	
1893			2,682	2,822.50				5,504.50	\$6,760.16
1894		278	52,789.75	14,269				57,337.25	69,247.27
1895	6,616.75		9,625	28,396.25	954			45,592	77,716.66
1896	294	8,873.50	3,788.35	12,890.55	807.50			26,153.90	46,241.65
1897		2,180.50	3,510.42	28,054.85	348.35			36,197.92	31,497.54
1898			6,930	26,656.50	221.5	1,015.7	500	35,323.70	27,106.50

TABLE IX.—Locations of shallow wells.

NORTHWEST.

Location.	Street or avenue.	Location.	Street or avenue.
West side.....	Thirty-fifth, near T.	Southeast corner..	Ninth and H.
Southwest corner..	Thirty-fourth, near U.	North side.....	Louisiana avenue, between Ninth and Tenth.
Northwest corner..	Thirty-fourth and Q.	East side	Thirty-second, near T.
Southwest corner..	Thirty-second and R.	Northwest corner..	Sixth and K.
West side.....	Thirty-second, between P and Q.	Northeast corner..	Sixth and H.
Southeast corner..	Fifth and Ridge.	East side	Sixth, between F and G.
Northeast corner..	Vermont avenue and L.	Southeast corner..	Thirty-second and Dumbarton.
Northwest corner..	Thirteenth and M.	Northwest corner..	Thirty-third and N.
West side.....	New Jersey avenue, between M and N.	West side.....	Valley, near Q.
Southeast corner..	New Jersey avenue and Pierce.	South side.....	O, between Thirty-first and Thirty-second.
	Twenty-seventh and K.	Northwest corner..	Twenty-eighth and O.
	Twenty-sixth and D.	East side	Third and L.
South side.....	Virginia avenue, between Twenty-first and Twenty-second.	Southeast corner..	Eleventh, near G.
North side.....	T, between Seventeenth and Eighteenth.	Northwest corner..	Eleventh and M.
	New York avenue, between Seventeenth and Eighteenth.	Northeast corner..	Tenth and K.
Northwest corner..	Sixteenth and Corcoran.	South side.....	Tenth and N.
	Seventeenth and K.		New York avenue, between Fourth and Fifth.
West side.....	Twelfth, between G and H.		New York avenue, between Sixth and Seventh.
Northwest corner..	Twelfth and New York avenue.	North side.....	G, between First and North Capitol.
	Twelfth and Massachusetts avenue.	Northeast corner..	Third and Indiana avenue.
Southeast corner..	Twelfth and N.	West side.....	Four-and-a-half, between C and D.
Southwest corner..	Twelfth and Florida avenue.	South side.....	E, between Seventeenth and Eighteenth.
	Twelfth and Q.	North side.....	Massachusetts avenue, between Sixth and Seventh.
East side	Sixth, near Lincoln.	South side.....	Wilson, between Third and Fourth.
West side.....	Brightwood avenue, south of Whitney.	Southeast corner..	Brightwood avenue and Irving.
Northeast corner ..	Sherman and Sheridan avenues.	East side	Brightwood avenue, Brightwood.
		Southwest corner ..	Eighth and Grant avenue.

NORTHEAST.

East side	North Capitol, between B and C.	Northwest corner..	Sixth and C.
Engine Co. No. 3 ..	Delaware avenue and C.	East side	Sixth, between A and B.
Southeast corner ..	First and K.	Northwest corner..	Eighth and A.
Northwest corner..	Third and C.	North side.....	E, between Eighth and Ninth.
	Third and Massachusetts avenue.	Northwest corner..	Eleventh and F.
Northeast corner ..	Second and G.	East side	Lincoln avenue, between S and T.
Northwest corner..	Fourth and E.	Southwest corner..	North Capitol and Randolph.
Northeast corner ..	Fourth and East Capitol.	North side.....	Keating avenue, near Lincoln avenue.
Southwest corner..	Fifth and A.		Seaton, between Twentieth and Twenty-first.
Southeast corner ..	Fifth and D.		
	Second and E.		

SOUTHWEST.

North side.....	Virginia avenue, between Tenth and Eleventh.	Southeast corner ..	Four-and-a-half and Maryland avenue.
Northeast corner ..	Eleventh and F.	North side.....	I, between Four-and-a-half and Sixth.
Southeast corner ..	Seventh and L.		B, between First and Second.
Northeast corner ..	Seventh and M.	Southwest corner..	South Capitol and N.
North side.....	K, between Sixth and Seventh.	Southeast corner ..	One-half and P.
East side	M, between Four-and-a-half and Sixth.		

TABLE IX.—Locations of shallow wells—Continued.

SOUTHEAST.

Location.	Street or avenue.	Location.	Street or avenue.
Southeast corner...	First and K.	Northeast corner...	Ninth and C.
North side.....	O, between One-half and First.	Southeast corner...	Ninth and E.
Southeast corner...	Third and Pennsylvania avenue.	Northwest corner...	Tenth and South Carolina avenue.
Southwest corner...	Third and C.	South side.....	South Carolina avenue, between Tenth and Eleventh.
West side.....	Fourth, near South Carolina avenue.	East side.....	Eleventh, between B and C.
Southeast corner...	Fourth and C.	South side.....	Eleventh, between G and L.
Northeast corner...	Fifth and G.	East side.....	I, between Eleventh and Twelfth.
West side.....	Sixth, between C and Pennsylvania avenue.	Southwest corner...	Eleventh, between N and O.
Southwest corner...	Sixth and B.	Twelfth and G.	Twelfth, between D and E.
Southeast corner...	Sixth and A.	South side.....	E, between Twelfth and Thirteenth.
Northwest corner...	Seventh and B.	West side.....	Thirteenth, between D and E.
East side.....	Seventh, between B and C.	South side.....	L, between Thirteenth and Fourteenth.
Northeast corner...	Seventh and Virginia avenue.	Southeast corner...	T street, Hillsdale.
Southeast corner...	Eighth and B.	Stanton and Elvans avenues, Hillsdale.	
West side.....	Eighth and A.	Northeast corner...	Washington and Pierce, Uniontown.
North side.....	Nichols avenue, opposite Birney School.	Southwest corner...	Harrison and Pierce, Uniontown.
	Jefferson, between Morris and Fillmore, Uniontown.	South side.....	Harrison and Minnesota avenues, Uniontown.
	Fillmore and Jackson, Uniontown.		
South side.....	K, between Thirteenth and Fourteen. .		

TABLE X.—Location of shallow wells filled during the fiscal year ending June 30, 1898.

D street, between Twenty-second and Twenty-third NW.	Sixth street and Maryland avenue SW.
Fifth street, between I and K NW.	D street, between Ninth and Tenth SW.
Eighth and F streets NW.	Second and I streets SE.
Caroline street, between Fifteenth and Sixteenth NW.	First and M streets SE.
B street, between Thirteenth and Fourteenth NE.	Eighth and I streets SE.
	Ninth street and South Carolina avenue SE.

TABLE XI.—Deep wells driven during the fiscal year ending June 30, 1898.

Location.	Completed.	Depth.	Material penetrated.	Depth of rock penetrated.	Analysis of water.	Flow per minute.
	1897.	<i>Feet.</i>		<i>Feet.</i>		<i>Gallons.</i>
Twelfth and K streets NW	July 13	188	Clay .....	.....	Good	12
Eighth street and Florida avenue NW.	July 26	103	Clay and rock	68	Bad.....	9
Lincoln avenue and Prospect street NE.	Aug. 7	162	....do	14	Good	7.50
Seventh and H streets SW	Aug. 14	144	Clay and gravel ..	.....	....do	12
Chevy Chase a.....	Aug. 26	85	Clay and rock	29	....do	12

a Cost paid for by appropriation for public schools.

TABLE XII.—Location of deep wells.

One-half and T streets SW.	Tenth and South Carolina avenue SE.
Second and Virginia avenue SW.	Third and M streets SE.
Fourteenth and C streets SE.	Sixth and B streets NW.
Second and North Carolina avenue SE.	N, between Fourth and Fifth streets NW.
Seventh and M streets NW.	Fairview, NE.
Twelfth and M streets NW.	Twentieth and Pennsylvania avenue NW.
O, between Sixth and Seventh streets, NW.	Eighth, between Richmond and Savannah streets NW.
Eleventh and East Capitol streets.	First and G streets NW.
Stanton and Elvans avenues, Hillsdale.	Twelfth and K streets NW.
Third and H streets NE.	Lincoln avenue and Prospect street NE.
Eighth and Florida avenue NW. a	Chevy Chase.
Seventh and H streets SW.	
Third and D streets SW.	

a Not in use.

TABLE XIII.—*Mains laid and miscellaneous work during the fiscal year 1897-98.*

New mains laid.	Linear feet.
12 inches diameter.....	7,697.70
8 inches diameter.....	907
6 inches diameter.....	50,709
4 inches diameter.....	6,623.20
3 inches diameter.....	2,630.20
2 inches diameter.....	1,632.70
1½ inches diameter.....	500
Connections to fire hydrants.....	1,305.50
Intersections and connections.....	600.60
Mains lowered.....	2,215
New stop valves.....	271
Stop valves repaired.....	99
Valve casings adjusted to grade.....	47
Fire hydrants erected.....	75
Fire hydrants moved.....	7
Fire hydrants adjusted to grade.....	12
Fire hydrants repaired.....	860
Public hydrants erected.....	11
Public hydrants abandoned.....	9
Public hydrants adjusted to grade.....	6
Public hydrants to replace old ones.....	6
Public hydrants repaired.....	614
Fountains erected.....	2
Fountains to replace old ones.....	5
Fountains adjusted to grade.....	5
Fountains repaired.....	149
Wells filled.....	11
Wells, deep driven.....	10
Wells cleaned.....	4
Pumps repaired.....	774
Taps made.....	1,872
Water meters set (water department).....	83

WATER DEPARTMENT, DISTRICT OF COLUMBIA,
Washington, July 1, 1898.

SIR: I have the honor to submit the following report on the Deacon waste-water meter, showing the waste and consumption of water in one of the sections of the city covered by the Deacon waste-water meter, and inclosing charts on a reduced scale showing the following results:

On February 23 and 24, 1898, night inspections were made between 12 p. m. and 6 a. m. of the houses on Fifth street, between Q and R streets NW., and on Warner street, between New Jersey avenue and Fifth street NW. The number of service pipes shut off was 47, supplying 216 people. The inclosed diagram (No. 2) of the Deacon meter shows consumption and waste of 1,920 gallons per hour—being a rate of 46,080 gallons per day, equal to 213 gallons per capita. The diagram (No. 2) shows that 17 of the 47 houses had leaking services. The houses were examined by the plumber of the water department on the following day, and the occupants notified to have the leaks repaired within forty-eight hours. After the allotted time for the repairs to be made had expired a second inspection was made, on March 22 and 23, 1898, between the hours of 12 p. m. and 6 a. m., of the houses on Fifth street between Q and R streets NW. The number of houses shut off was 29, supplying 150 people. The inclosed diagram (No. 3) of the Deacon meter shows consumption and waste of 240 gallons per hour, being a rate of 5,760 gallons per day, or 33 gallons per capita per day, indicating a saving of 84 per cent over the previous inspection.

In almost every case where the meter indicated waste the plumber found, on inspection on the following day, that there were leaky fixtures, showing that the waste was caused by bad plumbing or by willfully letting the water run to avoid freezing of the pipes during the cold weather.

Diagram No. 3 is taken after the occupants of the houses had had their plumbing put in order and notified to stop the waste of water. It is one of a number showing three sections of the city controlled by the Deacon meter. Each section covers three classes of houses, viz, the best class, the middle class, and the smaller houses generally occupied by negroes. In all the sections it was found by the second inspection that the waste of water was from 50 to 85 per cent of the actual quantity passing through the mains. The primary function of the Deacon meter is to give the authorities and others information which will guide them in the detection and suppression of waste.

The meter is an iron casting provided with sockets by means of which it is fixed upon the main. Within the casting a tapered tube is fitted, through which the water passes. Guided vertically within the tube by a hollow stem is a disk fitting the smaller end of the tapered tube. From the upper end of the stem fine wire passes through the gland to a small carriage, guided vertically and carrying a pencil from which a flexible wire cord passes over a pulley to a counterbalance weight whose tendency is to keep the disk constantly at the top of the tapered tube. Presented to the pencil is a sheet of metallic paper carried upon a drum, which is caused to revolve by a clock once in twenty-four hours. When water is passing through the meter, the disk is forced downward until the space around it becomes proportionate to the quantity of water passing through the meter, and the pencil is at the same time carried to a corresponding point on the diagram. The latter is ruled with horizontal lines, representing gallons per hour, and with vertical lines, representing hours, while the pencil, moving vertically, records the number of gallons passing through the meter; the drum with the diagram attached, moving horizontally, causes the quantity of water passing through the meter to be recorded at the proper time. Thus a diagram showing the number of gallons passing through the meter for every instant during the twenty-four hours is obtained.

METHOD OF WORKING THE METER.

The first step when introducing the waste-water meter is to decide upon a district which is supplied by a distribution main, or can be supplied by the closing of certain valves and isolating the district. The first day's diagram gives a complete and exact history of all that goes on in the district, and shows (1) the total supply of water, (2) the quantity used, and (3) the quantity wasted. The waste is readily perceived by means of the night line (the hours between 12 p. m. and 5 a. m.). It must be borne in mind that this waste is continuous throughout the twenty-four hours. The following day a second diagram is taken between midnight and 5 a. m., at a time when the use of water has practically ceased; the inspector closes the various street valves at intervals of a few minutes, commencing at the valves farthest from the meter and continues until all are closed, noting the time each valve is closed; then returning, the valves are reopened ready for the day's supply.

By means of the second diagram it may be found that the waste is confined to three or four streets out of the whole district. After ascertaining in which streets most of the waste is confined the method adopted to locate the houses which have leaky fixtures is as follows: Isolate as far as possible the street to be inspected by closing valves controlling the street, causing all the water to pass through the Deacon meter; then close off the stopcocks on the service pipes of each house to be inspected, at intervals of a few minutes, noting the time that each stopcock is closed. By reference to diagram No. 2 it will be seen where the leaks exist, and by a comparison with the notes when each house was shut off will show in which house the leak exists.

Very respectfully,

JNO. GREEN.

Mr. W. A. McFARLAND,
Superintendent Water Department.

TABLE XIV.—Size, number, and cost of meters placed in the public schools during the fiscal year ending June 30, 1898.

Size.	Number of meters.	Cost.	Size.	Number of meters.	Cost.
Five-eighths inch	8	\$287.32	2-inch	3	\$216.69
Three-fourths inch	47	1,854.47	3-inch	1	165.28
1-inch	22	1,070.19			
1½-inch	2	127.29	Total	83	3,721.24

150 OPERATIONS OF THE ENGINEER DEPARTMENT, D. C.

TABLE XV.—Connections of dead ends and service mains laid during the year 1897–98 for the betterment of the service.

Location.	Number of feet.	Assessment.	Cost.
<i>3-inch.</i>			
Reservation 10, between Third and Four-and-a-half streets and Pennsylvania avenue and C NW.....	223.8	.....	\$229.55
Square 624, between First and North Capitol and G and H NW.....	201.2	.....	120.81
Square 515, between Fourth and Fifth and K and L NW.....	334.3	.....	160.17
Square 442, between Sixth and Seventh streets and Rhode Island avenue and S NW.....	85.5	.....	63.65
Total.....	844.8	.....	574.18
<i>4-inch.</i>			
Square 81, between Twenty-first and Twenty-second and E and F NW.....	340	\$120.10	226.95
Square 786, between Third and Fourth and East Capitol and A NE.....	298	.....	190.85
Reservation 11, between Second and Third and B and C NW.....	204.8	.....	136.81
Square 449, between Sixth and Seventh and L and M NW.....	316.9	25.00	214.50
Fifth, between Wilson and Pomeroy NW.....	40	.....	.....
Square 571, between First and Second and D and E NW.....	249.1	167.50	139.42
Square south of 104, between Twentieth and Twenty-first and E and New York avenue NW.....	493	485.94	179.61
Total.....	1,941.8	798.54	1,088.14
<i>6-inch.</i>			
Sixth, between Lincoln street and Howard avenue NW.....	702.4	425.52	845.75
Elm, between Linden and Larch NW.....	345.1	504.20	186.33
Reservation 10, between Third and Four-and-a-half streets and Pennsylvania avenue and C NW.....	40.5	.....	.....
Fifth, between Wilson and Pomeroy NW.....	368.7	.....	295.70
South Capitol and C streets.....	91.6	.....	167.06
Total.....	1,548.3	929.72	994.84
SERVICE MAINS.			
<i>2-inch black pipe.</i>			
Philadelphia, between Thirteenth and Fourteenth NE.....	717.7	.....	158.38
<i>2-inch galvanized iron pipe.</i>			
Fifteenth, north from Kenesaw avenue NW.....	292.1	.....	75.58
Eighteenth east, between A south and A north.....	617	.....	168.16
Total.....	909.1	.....	243.74
<i>1 1/2-inch galvanized iron pipe.</i>			
Thirteenth, north from Milwaukee NE.....	450	.....	107.44
Milwaukee, east from Fifteenth NE.....	50	.....	14.35
Total.....	500	.....	121.79

Number of gallons of water consumed in certain public school buildings at the time meters were set and again after inspections were made and waste curtailed.

School.	Location.	Number of gallons per twenty-four hours between Dec. 20, 1897, and Jan. 5, 1898.	Number of gallons per twenty-four hours between Apr. 25, 1898, and May 2, 1898.
Wormley.....	Prospect, between Thirty-third and Thirty-fourth.....	22,931	6,255
Curtis.....	O, between Thirty-second and Thirty-third.....	7,936	6,248
Addison.....	P, between Thirty-second and Thirty-third.....	21,034	1,113
Mott.....	Sixth and Trumbull.....	13,776	1,440
Jackson.....	U, between Thirtieth and Thirty-first.....	2,340	683
High Street.....	Thirty-second and Thirty-third.....	1,593	1,167
Threlkeld.....	Thirty-sixth and Prospect.....	5,970	2,619
Bannacker.....	Third, between K and L NW.....	18,846	8,601
Gales.....	First and G NW.....	9,368	1,000
Peabody.....	Fifth and C NE.....	5,713	8,200

REPORT OF THE WATER REGISTRAR.

WASHINGTON, D. C., *August 1, 1898.*

SIR: I have the honor to submit the following report of the operations of the revenue and inspection division of the water department for the year ending June 30, 1898:

Inspections made	91, 644
Leaks found	5, 052
Leaks repaired	3, 884
Water bills delivered by inspectors	34, 065
Certificates of water taxes issued	5, 141
Meters set during year	130
Receipts of the water department from all sources from July 1, 1897, to June 30, 1898	\$330, 952. 11

The following tables are submitted:

Table I.—Statements of receipts of the water department from all sources from July 1, 1878, to June 30, 1898, amounting to \$4,546,873.61.

Table II.—Statement of expenditures from July 1, 1878, to June 30, 1898, amounting to \$2,710,081.67.

Table III.—Statement of assessments and collections of water main tax from June 30, 1878, to July 1, 1898. Total amount assessed, \$1,158,838.99; total amount collected, \$762,683.31.

Table IV.—Statement of advances to the Treasurer of the United States from 1880 to 1898, amounting to \$1,650,278.89.

Table V.—Number of dwellings and tenement houses supplied with Potomac water and number of miscellaneous water takers.

Table VI.—Number, kind, and size of water meters in use to June 30, 1898.

Very respectfully,

GEO. F. GREEN,
Water Registrar.

Capt. LANSING H. BEACH,
Corps of Engineers, U. S. A.,
Engineer Commissioner, District of Columbia.
(Through superintendent of water department.)

Financial statement from July 1, 1897, to June 30, 1898.

Receipts:

Current water tax	\$46, 218. 12	
Advertised water tax	8, 143. 53	
		\$54, 361. 65
Interest on current water tax	1, 833. 48	
Interest on advertised water tax	1, 957. 43	
		3, 790. 91
Water rent	264, 784. 48	
Water taps and stopcocks	6, 910. 65	
Water for building purposes, etc.....	1, 104. 42	
		330, 952. 11

Expenditures:

Salaries	37, 669. 45
Contingent expenses	1, 646. 54
Refunded water rents	915. 74
Pumping expenses and pipe distribution	94, 048. 00
High service	76, 260. 92
Interest and sinking fund—	
On account of increasing water supply	153. 12
On account of water-stock bonds	40, 168. 75
Amount of receipts over expenditures	80, 089. 59
	830, 952. 11

152 OPERATIONS OF THE ENGINEER DEPARTMENT, D. C.

Comparative statement of revenues.

Fiscal year.	Water rents.	Water-main assessments.	Taps.	Permits, etc.	Total revenues.
1886	\$124,896.22	\$36,162.04	\$5,096.00	\$3,450.03	\$169,613.29
1887	138,539.49	47,183.24	6,012.00	4,846.45	196,581.18
1888	171,892.49	34,264.85	4,182.00	4,809.42	215,149.26
1889	189,407.39	46,280.58	5,190.00	5,576.19	246,454.13
1890	197,053.34	45,386.55	5,313.72	6,327.95	254,081.56
1891	209,664.29	50,332.93	5,640.00	6,869.79	272,497.01
1892	220,892.93	68,807.35	5,790.00	6,280.81	301,771.09
1893	235,911.25	70,026.33	7,307.09	7,931.71	321,176.38
1894	245,899.69	86,975.44	4,497.00	1,168.79	338,540.92
1895	251,872.71	72,972.24	4,537.55	2,100.60	331,483.10
1896	255,439.11	27,666.57	4,026.00	1,191.09	288,323.77
1897	253,500.16	53,653.39	5,157.00	1,128.28	313,438.83
1898	264,784.48	58,152.56	6,910.65	1,104.42	330,952.11
1899 <i>a</i>	270,000.00	60,000.00	8,000.00	1,200.00	339,200.00
1900 <i>a</i>	275,000.00	60,000.00	9,000.00	1,200.00	345,000.00

a Estimated.

TABLE I.—Statement of receipts of the water department, District of Columbia, from July 1, 1878, to June 30, 1898.

Fiscal year.	Balance on hand July 1, 1878.	Mains to the Government Printing Office.	Water-main tax.		Interest on water-main tax.	
			Adver-tised.	Current.	Adver-tised.	Current.
Balance on hand July 1, 1878.....	\$16,809.42					
Received year ending June 30—						
1879			\$6,195.59	\$12,463.10	\$1,635.96	\$1,059.53
1880			10,248.87	11,926.81	3,457.43	1,340.18
1881			3,200.38	18,368.39	1,228.94	4,040.08
1882		\$2,800.00	4,017.92	3,305.50	2,086.07	392.34
1883		1,750.00	7,320.13	5,467.96	3,769.83	350.54
1884			3,563.12	8,700.53	2,385.59	122.42
1885			3,282.57	14,430.22	2,598.81	267.28
1886			3,564.81	29,631.30	2,343.44	622.49
1887			7,630.50	34,374.59	3,183.62	1,494.53
1888			8,605.53	19,939.91	5,120.55	598.86
1889			5,524.26	36,464.29	3,192.09	1,099.94
1890			9,207.61	29,257.28	5,364.04	1,557.62
1891			2,863.02	45,055.84	1,630.54	774.03
1892			4,562.67	60,415.38	2,064.56	1,764.74
1893			4,081.83	63,099.31	1,516.15	1,329.04
1894			3,764.01	80,407.07	1,273.32	1,531.04
1895			4,294.38	65,014.15	1,379.30	2,284.41
1896			560.65	26,071.07	372.98	662.87
1897			2,429.48	48,512.13	805.30	1,906.48
1898			8,143.53	46,218.12	1,957.43	1,833.48
Total	16,809.42	4,550.00	103,060.86	659,622.45	47,365.95	25,031.90

TABLE I.—Statement of receipts of the water department, District of Columbia, from July 1, 1878, to June 30, 1898—Continued.

Fiscal year.	Water rents.	Taps and stopcocks.	Permits and other sources.	Total receipts.
Balance on hand July 1, 1878.....				\$16,809.42
Received year ending June 30—				
1879.....	\$43,574.24	\$1,986.00	\$2,139.25	69,053.67
1880.....	165,641.42	1,930.00	2,188.10	196,762.81
1881.....	109,737.83	1,851.00	1,915.72	140,342.34
1882.....	101,621.10	1,815.00	1,789.71	117,827.64
1883.....	65,752.24	2,193.00	2,188.72	88,792.42
1884.....	119,610.20	2,373.00	2,418.79	139,173.65
1885.....	118,528.20	3,402.00	3,076.09	145,586.17
1886.....	124,896.22	5,096.00	3,459.03	169,613.29
1887.....	138,539.49	6,012.00	4,846.45	196,581.18
1888.....	171,892.49	4,182.00	4,809.92	215,149.26
1889.....	189,407.39	5,190.00	5,576.16	246,454.13
1890.....	197,053.34	5,313.72	6,327.95	254,081.56
1891.....	209,664.29	5,640.00	6,869.79	272,497.01
1892.....	220,892.93	5,790.00	6,280.81	301,771.09
1893.....	235,911.25	7,307.09	7,931.71	321,176.38
1894.....	245,899.69	4,497.00	1,168.79	338,540.92
1895.....	251,872.71	4,537.55	2,100.60	331,483.10
1896.....	255,439.11	4,026.00	1,191.09	288,323.77
1897.....	251,500.16	5,157.00	1,121.28	313,438.83
1898.....	264,784.48	6,910.65	1,104.42	330,952.11
Repayments during various fiscal years.....				47,554.40
Special assessments for service pipes.....				4,889.46
Total.....	3,484,218.78	85,259.01	68,511.38	4,546,873.61

TABLE II.—Expenditures.

Fiscal year.	Purchase of pump-house lot and erection of standpipe.	Extra clerical services making new water-rent and numerical books.	High service.	Material and labor, pumping expenses and pipe distribution.	Salaries, water department.	Contingent expenses.
Expended from July 1, 1878, to June 30, 1897.....	\$36,488.26	\$1,225.00	\$497,064.02	\$1,442,678.83	\$395,920.87	\$37,113.28
1898.....			76,260.92	94,048.00	37,669.45	1,646.54
Total.....	36,488.26	1,225.00	573,324.94	1,536,726.83	433,590.32	38,759.92

Fiscal year.	Water rent refund.	Water-main tax refund.	Interest on water-main tax re-funded.	Purchase of new pumping engines and boilers.	Water mains to Government Printing Office.	Total expenditures.
Expended from July 1, 1878, to June 30, 1897.....	\$44,774.73	\$2,094.19	\$194.29	\$33,041.24	\$8,946.21	\$2,499,541.02
1898.....	915.74					210,540.65
Total.....	45,690.47	2,094.19	194.29	33,041.24	8,946.21	2,710,081.67

154 OPERATIONS OF THE ENGINEER DEPARTMENT, D. C.

TABLE III.—Statement of assessments and collection of water-main tax from July 1, 1878, to June 30, 1898.

Fiscal year.	Amount assessed.	Duplicate payments and over-payments.	Six per cent abatement.	Amount of tax canceled subsequent to July 1, 1878.	Amount collected July 1, 1878, to June 30, 1898.	Amount outstanding July 1, 1898, subject to exemption act of Mar. 3, 1881.	Amount of collectible tax outstanding July 1, 1898.
From June 30, 1878, to June 30, 1897.....	\$1,093,005.06	\$2,104.45	\$25,744.76	\$199,053.85	\$708,321.08	\$4,113.78	\$158,474.04
1898.....	63,178.88		1,493.95	1,989.47	54,361.05		5,363.81
	1,156,184.54	2,104.45	27,240.71	201,023.32	762,682.13	4,113.78	163,837.87

a Of this amount \$94,134.78 was outstanding and collectible July 1, 1878.

RECAPITULATION.

Total amount of assessments plus duplicate payments.....	\$1,158,898.90
Amount of abatement at 6 per cent.....	27,240.71
Amount of tax canceled and struck off books since July 1, 1878:	
By orders of Commissioners, decisions of supreme court, etc.....	201,023.32
By amount subject to exemption, act March 3, 1881.....	4,113.78
Amount of tax collected from July 1, 1878, to June 30, 1898.....	762,682.13
Amount outstanding July 1, 1898—collectible tax.....	163,837.87
	1,158,898.90

TABLE IV.—Advances to Treasurer United States, ex officio commissioner of sinking fund, District of Columbia.

Fiscal year.	Interest and sinking fund water-stock bonds.	Interest and sinking fund 48-inch and Fourteenth street mains.	Interest and sinking fund increasing water supply.	Total interest and sinking fund.
1880.....	\$74,025.00			\$74,025.00
1881.....	74,123.77			74,123.77
1882.....	43,796.03			43,796.03
1883.....	44,610.00			44,610.00
1884.....	44,573.00			44,573.00
1885.....	44,610.00		\$13,096.23	58,396.23
1886.....	31,485.00		55,047.27	86,532.27
1887.....	57,735.00			57,735.00
1888.....	31,485.00		57,230.02	88,715.02
1889.....	44,610.00		76,055.00	121,265.00
1890.....	44,610.00		81,293.26	126,893.26
1891.....	44,610.00		71,164.21	115,774.21
1892.....	44,610.00		69,391.13	114,001.13
1893.....	44,610.00	\$39,712.00	68,817.14	153,139.14
1894.....	44,610.00	30,256.00	67,537.17	142,403.17
1895.....	44,610.00	30,082.70	62,052.77	136,745.47
1896.....	44,610.00	19,646.00	40,403.98	104,660.98
1897.....	40,327.06	7,457.00	13,040.75	60,824.81
1898.....	40,106.75		153.12	40,260.87
Total.....	\$64,420.00	\$9,181.00	\$77,676.24	1,050,378.00

TABLE V.—Premises in the District of Columbia supplied with Potomac water.

Dwellings and tenements.	North-west.	North-east.	South-west.	South-east.	Total.
To June 30, 1897	25, 395	6, 948	5, 118	5, 275	42, 736
Year ending June 30, 1898	946	300	154	357	1, 757
Total	26, 341	7, 248	5, 272	5, 632	44, 493

MISCELLANEOUS WATER TAKERS.

Asylums	3	2	1	6
Armories	7	.....	.....	7
Baseball grounds	2	.....	.....	2
Barber shops	109	8	7	130
Bakeries	60	8	18	85
Banks	16	.....	.....	18
Barrooms	268	34	66	406
Boarding houses	112	84	1	153
Breweries	3	1	1	6
Bottling depots	8	3	6	18
Bookbinderies	4	.....	.....	4
Baths	4	.....	.....	4
Brickyards .....	.....	2	.....	6
Colleges	13	1	.....	14
Churches	82	9	18	226
Cemeteries	3	1	.....	5
Clubrooms	10	.....	.....	11
Convents	2	2	.....	4
Car stables	12	5	3	24
Croquet grounds	3	.....	.....	3
Dining rooms	22	.....	.....	22
Dyehouses	20	4	2	28
Engine houses	10	2	1	16
Florists	3	.....	.....	3
Foundries	10	3	.....	13
Factories	2	.....	.....	4
Gas engines	3	2	1	6
Greenhouses	7	2	1	13
Halls	41	.....	3	51
Hospitals	10	2	1	14
Hotels	40	.....	.....	40
Laundries	40	2	4	50
Mannfactories	17	2	.....	21
Market houses	5	1	.....	7
Mills	11	.....	2	14
Museums .....	.....	.....	3	3
Motors	2	.....	.....	2
Orphan asylums	5	.....	.....	5
Offices	796	2	1	806
Printing offices	16	1	.....	17
Police stations	5	2	1	9
Photograph galleries	26	.....	.....	26
Restaurants	232	3	5	259
Railway stations	4	1	.....	5
Riding schools	2	.....	.....	2
Livery stables	59	4	1	70
Stables, private	846	82	21	984
Shops	147	8	9	173
Steam boilers	57	4	2	65
Steam engines	83	7	14	109
Slaughter houses .....	.....	2	.....	2
Stores	1, 428	41	76	1, 659
Schools, public	52	21	4	86
Schools, private	27	2	.....	32
Stone yards	12	4	1	17
Steamboat wharves .....	.....	.....	10	10
Theaters	6	.....	.....	6
Truck Company A .....	.....	1	.....	1
Truck Company B .....	.....	1	.....	1
Truck Company C	1	.....	.....	1
Truck Company D	1	.....	.....	1
Warehouses	48	6	18	78
Wood and coal yards	24	4	3	40
Total	4, 841	326	301	5, 796

154 OPERATIONS OF THE ENGINEER DEPARTMENT, D. C.

TABLE III.—Statement of assessments and collection of water-main tax from July 1, 1873, to June 30, 1898.

Fiscal year.	Amount assessed.	Duplicate payments and over-payments.	Six per cent abatement.	Amount of tax canceled subsequent to July 1, 1878.	Amount collected July 1, 1873, to June 30, 1898.	Amount outstanding July 1, 1898, subject to exemption act of Mar. 3, 1881.	Amount of collectible tax outstanding July 1, 1898.
From June 30, 1878, to June 30, 1897.....	\$1,093,605.66	\$2,104.45	\$25,746.76	\$199,053.85	\$708,821.66	\$4,113.78	\$158,474.06
1898	63,178.88	.....	1,493.95	1,969.47	54,361.65	.....	5,353.81
	1,156,784.54	2,104.45	27,240.71	201,023.32	762,683.31	4,113.78	163,827.87

a Of this amount \$94,124.78 was outstanding and collectible July 1, 1878.

RECAPITULATION.

Total amount of assessments plus duplicate payments	\$1,158,888.99
Amount of abatement at 6 per cent	27,240.71
Amount of tax canceled and struck off books since July 1, 1878:	
By orders of Commissioners, decisions of supreme court, etc	201,023.32
By amount subject to exemption, act March 3, 1881	4,113.78
Amount of tax collected from July 1, 1878, to June 30, 1898	762,683.31
Amount outstanding July 1, 1898—collectible tax	163,827.87
	1,158,888.99

TABLE IV.—Advances to Treasurer United States, ex officio commissioner of sinking fund, District of Columbia.

Fiscal year.	Interest and sinking fund water-stock bonds.	Interest and sinking fund 48-inch and Fourteenth street mains.	Interest and sinking fund increasing water supply.	Total interest and sinking fund.
1880	\$74,025.00	.....	.....	\$74,025.00
1881	74,123.77	.....	.....	74,123.77
1882	43,796.08	.....	.....	43,796.08
1883	44,610.00	.....	.....	44,610.00
1884	44,575.00	.....	.....	44,575.00
1885	44,610.00	.....	\$13,686.23	58,296.23
1886	81,485.00	.....	55,047.27	86,532.27
1887	57,735.00	.....	.....	57,735.00
1888	31,485.00	.....	57,239.02	88,724.02
1889	44,610.00	.....	76,655.69	121,265.69
1890	44,610.00	.....	81,283.26	125,893.26
1891	44,610.00	.....	71,164.21	115,774.21
1892	44,610.00	.....	69,991.13	114,601.13
1893	44,610.00	\$20,713.89	68,817.14	134,141.03
1894	44,610.00	20,358.80	67,537.17	132,505.97
1895	44,610.00	20,003.70	62,052.27	126,665.97
1896	44,610.00	19,648.60	40,408.98	104,667.58
1897	40,927.06	7,457.00	13,640.75	62,024.81
1898	40,168.75	.....	163.12	40,331.87
Total	884,420.66	88,181.99	677,676.24	1,650,278.89

TABLE V.—Premises in the District of Columbia supplied with Potomac water.

Dwellings and tenements.	North-west.	North-east.	South-west.	South-east.	Total.
To June 30, 1897	25,395	6,948	5,118	5,275	42,736
Year ending June 30, 1898	946	300	154	357	1,757
Total	26,341	7,248	5,272	5,632	44,493

MISCELLANEOUS WATER TAKERS.

Asylums	3	2		1	6
Armories	7				7
Baseball grounds	2				2
Barber shops	109	8	7	6	130
Bakeries	60	8	18	9	85
Banks	16			2	18
Barrooms	268	34	66	68	406
Boarding houses	112	34	1	6	153
Breweries	8	1	1	1	6
Bottling depots	8	8	6	1	18
Bookbinderies	4				4
Baths	4				4
Brickyards		2		4	6
Colleges	13	1			14
Churches	82	9	18	17	126
Cemeteries	3			1	5
Clubrooms	10			1	11
Convents	2	2			4
Car stables	12	5	3	4	24
Croquet grounds	3				3
Dining rooms	22				22
Dyehouses	20	4	2	2	28
Engine houses	10	2	1	3	16
Florists	3				3
Foundries	10	3			13
Factories	2			2	4
Gas engines	8	2	1		6
Greenhouses	7	2	1	3	13
Halls	41		3	7	51
Hospitals	10	2	1	1	14
Hotels	40				40
Laundries	40	2	4	4	50
Manufactories	17	2		2	21
Market houses	5	1		1	7
Mills	11		2	1	14
Museums			3		3
Motors	2				2
Orphan asylums	5				5
Offices	796	2	1	7	806
Printing offices	16	1			17
Police stations	5	2	1	1	9
Photograph galleries	26				26
Restaurants	232	3	5	19	259
Railway stations	4	1			5
Riding schools	2				2
Livery stables	59	4	1	6	70
Stables, private	846	82	21	35	984
Shops	147	8	9	9	173
Steam boilers	57	4	2	2	65
Steam engines	83	7	14	5	109
Slaughter houses		2			2
Stores	1,428	41	76	114	1,659
Schools, public	52	21	4	9	86
Schools, private	27	2	2	1	32
Stone yards	12	4	1		17
Steamboat wharves			10		10
Theaters	6				6
Truck Company A		1			1
Truck Company B		1			1
Truck Company C	1				1
Truck Company D	1				1
Warehouses	48	6	13	6	73
Wood and coal yards	24	4	3	9	40
Total	4,841	326	301	338	5,796

TABLE V.—*Premises in the District of Columbia supplied with Potomac water*—Continued.

SUMMARY, BY LOCATION, OF WATER TAKERS.

Location.	Houses supplied with Potomac water.		Miscellaneous water takers.	
	Number.	Per cent.	Number.	Per cent.
Northwest section.....	26,341	59.20	4,883	83.44
Northeast section.....	7,248	16.29	326	5.57
Southwest section.....	5,272	11.85	302	5.16
Southeast section.....	5,632	12.66	341	5.83
Total.....	44,493	.....	5,852	.....

TABLE VI.—*Meters.*

	Worth- ington.	Thom- son.	Crown.	Nash.	Union.	Niag- ara.	Lam- bert.	Regis- ter.	Total.
One-half inch.....		2	1	4					7
Five-eighths inch.....		2		2	1				5
Three-fourths inch.....	5	95	4	105	35	1	14		259
1 inch.....	14	84	23	139	38	1	1		300
1½ inch.....	14	49	27	74	5	1	1		171
2 inch.....	21	24	14	39	9		1		108
3 inch.....	18	5	7	9	3				37
4 inch.....	2	3	1	4			1		11
6 inch.....		1	3	2					6
Registers.....								8	8
Total.....	69	265	80	378	91	3	18	8	907

REPORT OF THE INSPECTOR OF ELECTRIC LIGHTING, IN CHARGE OF THE STREET-LIGHTING DEPARTMENT.

WASHINGTON, August 1, 1898.

SIR: I have the honor to submit the following report of the operations of the street-lighting department for the fiscal year ending June 30, 1898:

The increase of \$10,000 in the appropriation for street lighting enabled the department to establish many needed lamps in sections heretofore without light. A great many of the inhabited alleys have been lighted as far as the funds would permit, yet a number of important alleys, used exclusively for stables, have been omitted. These will be attended to to a great extent during the coming fiscal year.

The lighting of the Aqueduct Bridge was improved during June by adding 24 incandescent lamps to the 12 then in service, the lamps being arranged in clusters of 3 each. The greatly increased travel on the bridge, due to the location of Camp Alger near Falls Church, Va., demanded that better lighting facilities be provided.

The gas, naphtha, and incandescent lighting service has been well maintained to the entire satisfaction of the department.

The addition of 14 illuminated sign lamps of the Collis pattern at several of the important corners where arc lamps are used has been a decided improvement.

The following tables show the amount of work done during the year, the number of lamps lighted on June 30, 1898, as compared with the number on June 30, 1897, and the locations of the new lamps erected.

LIST OF ADDITIONAL GAS LAMPS ERECTED DURING THE FISCAL YEAR 1898.

Northwest.—Two on G street, between Seventeenth and Eighteenth streets; 1 on G street, between Eighteenth and Nineteenth streets; 1 on Twentieth street, between F and G streets; 1 on Twentieth street, between G and H streets; 1 on Twenty-first street, between F and G streets; 1 on Twenty-first street, between G and H streets; 1 on Twenty-first street, between H and I streets; 1 on N street, between Seventeenth street and Scott circle; 2 on O street, between Fourth and Fifth streets; 1 on O street, between Fifth and Sixth streets; 1 on L street, between New Jersey avenue and Third street; 1 on L street, between Third and Fourth streets; 1 on Columbia street, between O and P streets; 1 on Columbia street, between P and Q streets; 1 at corner Twentieth and I streets; 1 at corner Twenty-fifth and N streets; 1 on Twenty-third street, between L and M streets; 1 on Twenty-second street, between M and N streets; 2 in front of No. 7 engine house, R between Ninth and Tenth streets; 1 on west

side Sixteenth street, between U and V streets; 1 on east side Sixteenth street intersection of New Hampshire avenue; 1 on east side Sixteenth street, between U and V streets; 1 on west side Sixteenth street, between V street and Florida avenue; 1 on east side Sixteenth street, between V street and Florida avenue; 1 on northeast corner Sixteenth street and Florida avenue; 1 on south side Westminster street, between Ninth and Tenth streets; 1 at corner Ninth and Westminster streets; 1 at corner Ninth and French streets; 1 on S street opposite Phelps place; 1 in alley between Twenty-first and Twenty-second streets, E and F streets; 1 on north side Florida avenue, between Fourteenth and Fifteenth streets; 2 in alley between Nineteenth and Twentieth, M and N streets; 2 in alley between Second and Third, B and C streets; 1 in alley between Ninth and Tenth, T and U streets; 1 in alley between Ninth and Tenth, Rhode Island avenue and R street; 1 in alley between Ninth and Tenth, M and N streets; 3 in alley between Sixth and Seventh, S and T streets; 5 in alley between Sixth and Seventh, M and N streets; 4 in alley between Sixth and Seventh, L and M streets; 3 in alley between Fourth and Fifth, N and O streets; 2 in alley between Second and Third, G street and Massachusetts avenue; 1 in alley between Sixth and Seventh, N and O streets; 1 in alley between K and L streets, Fourteenth street and Vermont avenue; 1 in front of No. 1334 V street; 1 on Fifteenth street extended north of Florida avenue; 1 on Q street between Twenty-second and Twenty-third streets; 1 on west side Twenty-third street, between G and H streets; 1 at northeast corner First and Bates streets; 2 on south side Bates street, between First and North Capitol streets; 2 on Florida avenue, between First and North Capitol streets; 4 on U street, between Seventeenth and Eighteenth streets; 2 on Thirty-sixth street, between Prospect and M streets; 1 on Thirty-fifth street, between P and Q streets; 2 on Jefferson street, between K street and Chesapeake and Ohio canal; 1 on east side Thirty-fourth street, between M street and Chesapeake and Ohio canal; 1 on north side R street, between Thirty-fourth and Thirty-fifth streets; 1 in alley, Cambridge place and Q and Thirtieth streets.

Northeast.—Two in front of engine house, North Capitol and Quincy streets; 3 on Florence street, between F street and Maryland avenue; 3 on Elliott street, between F street and Maryland avenue; 3 on Fourteenth street, between F and G streets; 6 on F street, between Twelfth and Fifteenth streets; 3 on Eleventh street, between Maryland avenue and D street; 1 on Ninth street, between Massachusetts avenue and B street; 1 at southwest corner Sixth and L streets; 1 on Tenth street, between Massachusetts avenue and B street; 1 on Fourth street, between K and L streets; 1 on Tenth street, between B and C streets; 1 on west side Ninth street, between K and L streets; 1 at northeast corner Fourteenth and E streets; 1 at northeast corner Tennessee avenue and E street; 1 on south side Q street, between North Capitol and First streets; 2 on Pickford place, between F and G and Eighth and Ninth streets.

Southwest.—One on Sixth-and-a-half street, between D and E streets; 1 on Third street, between H and I streets; 1 at corner Robinson and M streets; 1 on Delaware avenue, between G and H streets; 1 on southeast corner Delaware avenue and H street; 1 on Sixth-and-a-half and E streets; 1 at west side South Capitol street, between Virginia avenue and E street; 2 in alley between Four-and-a-half and Sixth and H and I streets; 1 in alley between Four-and-a-half and Sixth and L and M streets; 1 in alley between Third and Four-and-a-half and F and G streets; 1 in alley between Third and Four-and-a-half and E and F streets; 2 in alley between First street and Delaware avenue, D and E streets.

Southeast.—One on south side South Carolina avenue, between Thirteenth and Fourteenth streets; 1 on Fourth street, between G street and Virginia avenue; 1 on Fourth street, between South Carolina avenue and G street; 1 on Fourth street, between D and E streets; 1 on D street, between Ninth and Tenth streets; 1 on D street, between Tenth and Eleventh streets; 1 on D street, between Eleventh and Twelfth streets; 1 at southwest corner Seventh and D streets; 1 on D street, between Sixth and Seventh streets; 1 at corner Twelfth and D streets; 2 on C street, between New Jersey avenue and South Capitol street; 1 at southeast corner C street and South Carolina avenue; 1 at corner Fourth and C streets; 1 at corner Sixteenth and C streets; 1 on C street, between Fifteenth and Sixteenth streets; 2 in alley between Sixth and Seventh and A and B streets; 1 in alley between Sixth and Seventh and E and G streets; 1 on east side Eleventh street, between Pennsylvania avenue and G street; 2 on Heckman street, between First and Second and E and F streets; 1 on Massachusetts avenue, between Kentucky avenue and Thirteenth street.

Columbia Heights.—Two on Kenesaw street, between Thirteenth and Fourteenth streets; 1 at northwest corner Whitney and Holmead avenues; 1 in front of 1421 Binney street; 2 on Welling place, between Fourteenth street and University place; 1 on Lamar place, between Eslin and Morgan streets; 1 on Binney street, between Fourteenth and Sixteenth streets; 2 on Kenesaw avenue, between Fourteenth and Fifteenth streets; 2 on Harvard street, between Thirteenth street and Sherman avenue; 1 on Roanoke street, between Thirteenth street and Sherman avenue; 1 at southeast corner Kenesaw avenue and Sixteenth street; 1 on Kenesaw avenue, between Fifteenth and Sixteenth streets.

Mount Pleasant.—One on Seventeenth street extended north of Howard avenue; 1 at north side of Meridian street between Brown and Center streets.

Washington Heights.—One at west side of Eighteenth street, between California and Wyoming avenues; 1 at southwest corner of Eighteenth street and California avenue; 2 on California avenue, between Eighteenth and Nineteenth streets; 1 at corner Nineteenth street and California avenue; 1 on Nineteenth street, between California and Vermont avenues; 1 on Nineteenth street, between Vermont and Florida avenues.

Takoma Park.—One at corner of Blair road and Chestnut avenue; 1 on Wabash avenue and Piney Branch road; 1 on Piney Branch road opposite church; 1 on Chestnut avenue, between Blair road and railroad; 2 on Blair road, between Chestnut avenue and Carroll avenue.

Anacostia.—One at corner of High street and Maple avenue; 1 on High street, between Maple avenue and Valley street; 1 at corner of High and Valley streets.

County.—Twenty-two on Rock Creek Church road, between Brightwood avenue and Soldier's Home; 6 on Fourteenth street extended, between Brightwood avenue and "A" road; 2 in front of Brightwood engine house; 1 on Brightwood avenue between Genesee street and Shepherd road; 1 at southwest corner of First and Randolph streets; 1 at west side of First street, between Randolph and S streets; 1 at southwest corner of First and Seaton streets; 1 on west side of First street, between Seaton and T streets; 1 at northwest corner of First street and Rhode Island avenue; 1 on First street, between Rhode Island avenue and U street; 1 at southwest corner of First and U streets; 1 on west side of First street, between U and V streets; 1 at southwest corner of First and V streets; 1 on west side of First street, between V and W streets; 1 at southwest corner of First and W streets; 2 on Oak street, between Harewood avenue and Linden street; 1 on Brightwood avenue and Marshall street; 1 on south side of Quincy street, between Lincoln avenue and First street.

LOCATION OF COLLIS LAMPS ERECTED DURING THE FISCAL YEAR 1898.

Northwest.—One at southwest corner of Ninth street and New York avenue; 1 at northwest corner of Seventh street and Pennsylvania avenue; 1 at northeast corner of Fifteenth and F streets; 1 at southeast corner of Fourteenth street and New York avenue; 1 at northeast corner of Vermont avenue and H street; 1 at northwest corner of Sixth and B streets; 1 at northwest corner of Fourteenth and F streets; 1 at southwest corner of Sixth street and Pennsylvania avenue; 1 at southwest corner of Seventh street and Pennsylvania avenue; 1 at northwest corner of Fifteenth and I streets; 1 at northeast corner of Fifteenth and G streets; 1 at northeast corner of Sixth street and Pennsylvania avenue; 1 at northeast corner of Fifteenth street and Pennsylvania avenue; 1 at northwest corner of Ninth and F streets.

ADDITIONAL NAPHTHA LAMPS ERECTED DURING THE FISCAL YEAR 1898.

Northwest.—One at east side Twentieth street, between New York avenue and E street; 1 at northwest corner Twentieth street and New York avenue; 3 on New York avenue, between Nineteenth and Twentieth streets; 1 at southeast corner Twentieth street and New York avenue; 2 in alley between Twenty-fifth and Twenty-sixth streets and Pennsylvania avenue and M street; 3 in alley between Twelfth and Thirteenth and R and S streets; 1 in alley between Twelfth and Thirteenth and R and S streets; 2 in alley between Nineteenth and Twentieth and R and S streets; 2 in alley between Thirty-first and Thirty-second and M and N streets; 1 on South street, between Thirty-first and Thirty-second and Canal and K streets; 2 in alley between Thirty-third and Thirty-fourth and M and Canal streets; 1 on Thirty-fourth street, between Q and R streets; 1 on Thirty-fourth street, between R and S streets; 1 on Thirty-fourth street, between S and T streets; 1 on Thirty-fourth street, between T and U streets; 4 on Thirty-fourth street, between U and Thirty-second streets; 1 on S street, between Thirty-third and Thirty-fourth streets; 1 on S street, between Thirty-fourth and Thirty-fifth streets; 3 in alley between Twenty-sixth and Twenty-seventh and K and L streets; 3 in alley between Twenty-sixth and Twenty-seventh and I and K streets; 1 in alley between Twenty-third and Twenty-fourth and L and M streets; 1 in alley between Twenty-third and Twenty-fourth and G and H streets; 1 in alley between Twenty-third and Twenty-fourth and E and F streets; 3 in alley between Twenty-second and Twenty-third and L and M streets; 2 in alley between Twenty-second and Twenty-third streets and Pennsylvania avenue and I street; 3 in alley between Twenty-second street and New Hampshire avenue and M and N streets; 2 in alley between Twentieth and Twenty-first and K and L streets; 1 in alley between Twenty-first and Twenty-second and G and H streets; 1 in alley between Nineteenth and Twentieth and K and L streets; 1 in alley between Eighteenth and Nineteenth and K and L streets; 2 in alley between Seventeenth and Eighteenth and D and E streets; 1 on north side New York avenue, between Twentieth and Twenty-first streets; 2 in alley between Second and Third and F and G

streets; 2 in alley between Second and Third and H and I streets; 1 in alley between First street and New Jersey avenue and Pierce and M streets; 2 in alley between Sixth and Seventh and P and Q streets; 1 in alley between Twelfth and Thirteenth and N and O streets; 2 in alley between Twelfth and Thirteenth and S and T streets; 2 in alley between Twelfth and Thirteenth and T and U streets; 1 in alley between Fourteenth and Fifteenth and T and U streets; 1 in alley between Vermont avenue and Tenth and U and V streets; 2 in alley between Florida avenue and Tenth and V and W streets; 2 in alley between Chesapeake and Ohio Canal and Thirty-first and Thirty-second streets; 1 in alley between First and Third and N and O streets.

Northeast.—One at southwest corner Florida avenue and O street; 1 at southwest corner Florida avenue and Second street; 1 on south side Florida avenue, between Second street and Delaware avenue; 1 at southwest corner Florida and Delaware avenues; 1 at southeast corner Florida avenue and Third street; 1 on south side Florida avenue, between Third and Fourth streets; 1 at southwest corner Florida avenue and N street; 1 at southwest corner Florida avenue and Fourth street; 1 on south side Florida avenue, between Fourth and Fifth streets; 1 at southwest corner Florida avenue and Fifth street; 1 on south side Florida avenue, between Fifth and Sixth streets; 1 at southeast corner Florida avenue and Sixth street; 1 on south side Florida avenue, between Sixth and Seventh streets; 1 on south side Florida avenue, between Seventh and Eighth streets; 1 at southwest corner Florida avenue and Eighth street; 1 on south side Florida avenue, between Eighth and Ninth streets; 1 at southwest corner Florida avenue and Ninth street; 2 in alley between First and Second and B and C streets; 2 in alley between Second and Third and L and M streets; 1 in alley between Second and Third and K and L streets; 1 in alley between Thirteenth and Fourteenth and G and H streets; 4 in alley between North Capitol and First and H and I streets; 3 in alley between Delaware avenue and First street and B and C streets; 1 in alley between Second and Third and F and G streets; 2 in alley between Sixth and Seventh and H and I streets; 1 in alley between Sixth and Seventh and G and H streets; 2 in alley between Eighth and Ninth and G and H streets.

Southwest.—One in alley between Four-and-a-half and Sixth and C and D streets; 2 on K street bridge over James Creek Canal; 2 in alley between First street and Delaware avenue and B and C streets; 1 on C street, between First street and Delaware avenue; 2 at corners Delaware avenue and C street; 3 on Delaware avenue, between B and C streets; 2 on Delaware avenue, between C and Canal streets; 2 on C street, between Delaware avenue and South Capitol street; 1 at corner South Capitol and C streets; 1 on west side Delaware avenue, between H and I streets; 1 on east side Delaware avenue, between H and I streets; 1 at northwest corner Delaware avenue and I street; 1 at southeast corner Delaware avenue and I street; 1 on west side Delaware avenue, between I and K streets; 1 on east side Delaware avenue, between I and K streets; 2 on east side Delaware avenue, between K and L streets; 2 on west side Delaware avenue, between L and M streets; 1 on east side Delaware avenue, between L and M streets; 1 on Third street, between L and M streets; 2 in alley between Thirteen-and-a-half and Fourteenth and C and D streets; 2 in alley between Twelfth and Thirteenth and C and D streets; 1 in alley between Ninth and Tenth and F and G streets; 1 in alley between Sixth and Seventh and I and K streets; 1 in alley between Four-and-a-half and Sixth and F and G streets; 1 in alley between Four-and-a-half and Sixth and G and H streets; 1 in alley between Four-and-a-half and Sixth and I and K streets; 4 in alley between Four-and-a-half and Sixth and M and N streets; 2 in alley between Third and Four-and-a-half and L and M streets; 1 in alley between Third and Delaware avenue and L and M streets; 1 in alley between Third and Four-and-a-half and G and H streets; 2 in alley between Delaware avenue, Canal, and E streets; 4 on Third street, between M and N streets; 1 on Second street, between K and L streets; 2 on I street, between First and Half streets; 1 on Second street, between I and K streets; 1 on H street, between Ninth and Tenth streets; 1 on west side Ninth street, between G and H streets; 1 on northwest corner Ninth and H streets; 1 on southeast corner Ninth and H streets; 1 on Ninth street, between H and I streets; 1 on southeast corner Ninth and I streets; 1 on east side Eighth street, between H and I streets; 1 on northwest corner Eighth and I streets; 1 on southeast corner Eighth and I streets; 1 on west side Eighth street, between I and K streets; 1 on northeast corner Eighth and K streets; 1 on north side H street, between Half and First streets; 1 on west side Half street, between G and H streets; 1 on east side Half street, between H and I streets.

Southeast.—One at corner Fifteenth and East Capitol streets; 1 on Fifteenth street, between East Capitol and A streets; 1 on Fifteenth street, between A and B streets; 1 on Fifteenth street, corner B street; 1 on B street, between Fifteenth and Sixteenth streets; 1 on B street, corner Sixteenth street; 1 on B street, between Sixteenth and Seventeenth streets; 1 on Fifteenth street and South Carolina avenue; 2 on Fifteenth street, between South Carolina avenue and C street; 1 on C street, between Sixteenth and Seventeenth streets; 1 at corner Seventeenth and C streets; 1 at cor-

ner Massachusetts avenue and B street; 1 at corner Fourteenth and B streets; 2 on B street, between Thirteenth and Fourteenth streets; 1 on Thirteenth street, between A and B streets; 1 on Thirteenth street, between B and C streets; 1 on Thirteenth street, between C and D streets; 2 on D street, between Twelfth and Thirteenth streets; 2 on Second street, between L and M streets; 3 on First street, between M and N streets; 2 on First street, between N and O streets; 1 at corner First and O streets; 2 on O street, between Half and First streets; 1 on G street, between Thirteenth and Fourteenth streets; 1 on L street, between Second and Third streets; 1 at corner Half and O streets; 2 on Half street, between N and O streets; 1 at corner Fifteenth and A streets; 2 in alley between First and Second and C and D streets; 1 at northeast corner Fourteenth street and South Carolina avenue; 1 on north side South Carolina avenue, between Fourteenth and Fifteenth streets; 1 on Walter street, between Twelfth and Thirteenth and B and C streets; 2 in alley between Eleventh and Twelfth and B and C streets; 1 in alley between Sixth and Seventh and Pennsylvania avenue and C street; 1 in alley between Third and Fourth and A and B streets; 1 in alley between First street and New Jersey avenue and M and N streets; 2 in alley between Sixth and Seventh and G and I streets; 2 in alley between Twelfth and Thirteenth and K and L streets; 2 in alley between Thirteenth street and Kentucky avenue and C and D streets; 1 in alley between Eighth and Ninth and G and E streets; 2 in alley between First and Second and N and O streets; 1 in alley between G and I and Sixth and Seventh streets.

County.

Trinidad.—Seven on Twelfth street extended, north of Q street.

Icy City.—One at corner Capitol avenue and Olivette street; 1 at corner Capitol avenue and Kendall street; 1 at corner Capitol and Central avenues; 1 at corner Capitol avenue and Providence street; 1 at corner Fenwick street, at railroad crossing; 1 at corner Fenwick street, between Capitol avenue and Gallaudet street; 1 on Providence street, between Capitol avenue and Gallaudet street; 1 on Central avenue, between Capitol avenue and Gallaudet street; 1 on Kendall street, between Capitol avenue and Gallaudet street; 1 on Corcoran street, between Olivette and Gallaudet streets; 1 at corner Capitol avenue and Fenwick street; 1 at corner Olivette and Corcoran streets.

Anacostia.—One at intersection of High and Pierce streets; 2 on Pierce street, between Valley and Jefferson streets; 5 on Howard avenue, between Nichols avenue and river; 6 on Sumner avenue, between Nichols avenue and river; 2 on Polk street, between Jefferson and Arthur streets; 2 on Franklin street, east of Nichols avenue; 4 on Morris road, between Nichols avenue and Baltimore street.

Brightwood Park.—One at corner Eighth and Flint streets; 1 at corner Seventh and Flint streets; 1 on Flint street, between Fifth and Seventh streets; 1 at corner Flint and Fifth streets; 1 at corner Eighth and Erie streets; 1 at corner Seventh and Erie streets; 1 on Erie street, between Fifth and Seventh streets; 1 at corner Fifth and Erie streets; 1 on Eighth and Des Moines streets; 1 at corner Seventh and Des Moines streets; 1 on Des Moines street, between Fifth and Seventh streets.

Winthrop Heights.—One at corner Montello avenue and Charles street; 1 at corner Lawrence avenue and Charles street; 1 at corner Lafayette avenue and Charles street; 1 on Lawrence avenue, between Charles street and Queens Chapel road; 1 on Montello avenue, between Charles street and Queens Chapel road.

Columbia Heights.—Two on north side Roanoke street, between Thirteenth street and Sherman avenue; 2 on north side Harvard street, between Thirteenth street and Sherman avenue; 1 at southeast corner Binney and Fifteenth streets.

Mount Pleasant.—One on Lowell street, between Seventeenth and Eighteenth streets; 1 at corner Eighteenth and Lowell streets; 1 at corner Eighteenth and Milwaukee streets; 1 at corner Eighteenth street and Howard avenue.

Rosedale and Isherwood.—One on Gales street, between Sixteenth and Seventeenth streets; 2 on Kramer street, between Sixteenth and Seventeenth streets; 1 on Rosedale street, between Sixteenth and Seventeenth streets; 1 on Sixteenth street, between Rosedale and E streets; 1 at corner Seventeenth and Kramer streets; 1 at corner Seventeenth and Gales streets; 2 on Seventeenth street, between Gales street and Benning road; 1 on Nineteenth street, between Gales street and Benning road; 1 at corner Nineteenth and Gales streets; 1 at corner Twentieth and Gales streets; 1 at corner Twentieth and Seaton streets.

One at northeast corner North Capitol and Randolph streets; 1 at southeast corner North Capitol and Seaton streets; 1 at southwest corner North Capitol and T streets; 1 on north side Irving street, between Sherman avenue and Seventh street; 2 on north side Sheridan street, east of Brightwood road; 2 on south side Sheridan street, east of Brightwood road.

One on northeast corner King and Trinidad streets; 1 on northwest corner Turner and Trinidad streets; 1 on northwest corner Levis and Trinidad streets; 1 on east side Trinidad street, between Levis and King streets; 2 on Keating avenue north of Lincoln avenue.

ADDITIONAL INCANDESCENT LAMPS ESTABLISHED DURING THE YEAR 1898.

Eight on Newark street, from Tennallytown road to Thirty-fourth street; 2 on Newark street, east of Thirty-fourth street; 14 on Canal road, from Aqueduct Bridge to Conduit road; 5 on Fourth street, between T and V streets, Eckington; 1 on T street, between Second and Third streets, Eckington; 24 on Aqueduct Bridge.

NAPHTHA LAMPS CHANGED TO GAS DURING FISCAL YEAR 1898.

Northwest.—One on north side S street, between First and North Capitol streets; 1 on northeast corner First and S streets; 1 on northwest corner North Capitol and S streets; 1 on north side Q street, between Thirty-fourth and Thirty-fifth streets; 1 on east side of Thirty-sixth street, between O and P streets; 5 on Florida avenue, between First and North Capitol streets; 1 on R street, between First and North Capitol streets.

Northeast.—One on northeast corner First and O streets; 2 on Florida avenue, between North Capitol and First streets; 1 on Patterson street, between North Capitol and First streets; 3 on L street, between North Capitol and First streets; 2 on Eleventh street, between F and G streets; 2 on Eleventh street, between G and H streets; 2 on I street, between Thirteenth street and Florida avenue; 1 at corner Florida avenue and I street; 2 on Florida avenue, between Thirteenth and Fourteenth streets; 1 on Tenth street, between D and E streets; 2 at corner Tenth and D streets; 1 on D street, between Tenth and Eleventh streets; 2 at corner Eleventh and K streets; 1 on Eleventh street, between I and K streets; 1 on Eleventh street, between K street and Florida avenue; 17 on M street, from North Capitol to Fourth street; 3 on Eleventh street, between Maryland avenue and D street.

Southwest.—Two on Third street, between E and F streets; 3 on E street, between South Capitol and First streets; 6 on Virginia avenue, between First and Third streets; 7 in alley, between Third and Four-and-a-half and B and C streets.

Southeast.—Four on E street, between New Jersey avenue and South Capitol street; 4 on New Jersey avenue, between M and N streets; 3 on Georgia avenue, between Third and Fourth streets; 4 on Virginia avenue, between Seventh and Eighth streets; 1 on east side Twelfth street, between South Carolina avenue and D street; 1 on north side C street, between Twelfth and Thirteenth streets; 1 at corner Thirteenth and C streets; 1 on C street, between Thirteenth street and Kentucky avenue; 1 at corner Kentucky avenue and C street; 1 at corner Fourteenth and C streets; 1 on C street, between Fourteenth and Fifteenth streets; 1 at corner Fifteenth and C streets; 1 on I street, between Second and Third streets; 12 on South Capitol street, from I to M street.

County.—One at corner Seventh street and Bunker-hill road; 1 on Bunker-hill road, between Seventh street and railroad; 4 at railroad crossing on Bunker-hill road; 1 on Bunker-hill road, between railroad and Tenth street; 2 at corner Bunker-hill road and Tenth street; 2 at corner Bunker-hill road and Eleventh street; 2 at corner Milwaukee and Tenth streets; 1 on Tenth street, between Lowell and Milwaukee streets; 1 at corner Tenth and Lowell streets; 2 at corner Milwaukee and Eleventh streets; 1 on Milwaukee street, between Eleventh and Twelfth streets; 2 at corner Milwaukee and Twelfth streets; 2 on Milwaukee street, between Twelfth and Thirteenth streets; 1 at corner Thirteenth and Milwaukee streets; 1 on Twelfth street, between Lowell and Milwaukee streets; 2 at corner Twelfth and Lowell streets; 1 on Lowell street, between Twelfth and Thirteenth streets; 1 at corner Thirteenth and Lowell streets; 2 at corner Twelfth and Keokuk streets; 4 on Bunker-hill road, from Fourth to Seventh street.

Table showing the distribution of the new lamps established during the fiscal year 1898.

Kind of light.	Northwest.		Northeast.		Southwest.		Southeast.		County.		Total.
	Streets.	Alleys.	Streets.	Alleys.	Streets.	Alleys.	Streets.	Alleys.	Streets.	Roads.	
Gas	53	28	31	.....	7	7	20	3	47	42	238
Naphtha	17	56	17	19	47	22	40	17	93	.....	328
Incandescent .....	.....	.....	.....	.....	.....	.....	.....	.....	40	14	54
Collis	14	.....	.....	.....	.....	.....	.....	.....	.....	.....	14
Arc	81	.....	.....	.....	.....	.....	6	.....	.....	.....	90
Total	168	84	48	19	54	29	66	20	180	46	714

162 OPERATIONS OF THE ENGINEER DEPARTMENT, D. C.

Number of lamps of all kinds in use on July 1, 1893, as compared with July 1, 1897.

	1897.	1893.
Gas	6,053	6,310
Collis	1	15
Naphtha	1,077	1,257
Incandescent	214	268
Arc	508	598
Total	7,853	8,448

Increase during the year, 595 lamps.

The changes have been as follows:

	Added.	Discontinued.
Gas	382	125
Collis	14	
Naphtha	337	157
Incandescent	54	
Arc	90	
Total	877	282

Increase during the year, 595 lamps.

	Gas.	Naphtha.
Number of posts moved and reset (a)	112	52
Number of posts moved and reset	64	9
Number of broken posts reerected	18	4
Number of unused posts taken down	76	2
Number of new posts erected	202	332

a Chargeable to other appropriations.

ELECTRIC LIGHTING.

Ninety additional electric arc lamps were established during the year, distributed between the two companies as follows:

ADDITIONAL ARC LAMPS LIGHTED DURING FISCAL YEAR 1898, AND MAINTAINED BY THE UNITED STATES ELECTRIC LIGHTING COMPANY.

Northwest.—One on Fourteenth street, between Pennsylvania avenue and F street; 1 on Fourteenth street, between F and G streets; 1 on southeast corner Fifteenth and E streets; 2 on south side G street, between Thirteenth and Fourteenth streets; 1 on north side G street, between Thirteenth and Fourteenth streets; 1 on southwest corner Thirteenth and G streets; 1 on west side Thirteenth street, between G and H streets; 1 on north side G street, between Twelfth and Thirteenth streets; 1 on south side G street, between Twelfth and Thirteenth streets; 1 on east side Twelfth street, between Pennsylvania avenue and E street; 1 on Twelfth street, between E and F streets; 1 on west side Twelfth street, between F and G streets; 1 on northeast corner Twelfth and G streets; 1 on southwest corner Eleventh and G streets; 1 on G street, between Tenth and Eleventh streets; 1 on southwest corner Tenth and G streets; 1 on north side G street, between Ninth and Tenth streets; 1 on south side G street, between Ninth and Tenth streets; 1 on north side G street, between Eighth and Ninth streets; 1 on northwest corner Eighth and G streets; 1 on north side G street, between Seventh and Eighth streets; 2 on H street, between Thirteenth and Fourteenth streets; 1 on east side Tenth street, between E and F streets; 1 on north side E street, between Eleventh and Twelfth streets; 1 on north side E street, between Twelfth and Thirteenth streets; 1 on south side E street, between Twelfth and Thirteenth streets; 1 on east side Fifteenth street, between Pennsylvania avenue and F street; 1 on east side Fifteenth street, between F and G streets; 1 on south side E street, between Tenth and Eleventh streets; 1 on northwest corner Seventeenth and K streets; 1 on east side Seventeenth street, between I and K streets; 1 on southwest corner Seventeenth and I streets; 1 on east side Seventeenth street, between H and I streets; 1 on northwest corner Eighteenth and H streets; 1 on north side H street,

between Connecticut avenue and Seventeenth street; 1 on southeast corner Jackson place and H street; 1 on north side H street, between Connecticut avenue and Sixteenth street; 1 on south side H street, opposite Sixteenth street; 1 on north side H street, between Vermont avenue and Sixteenth street; 1 on southeast corner Thirteenth-and-a-half street and Pennsylvania avenue; 1 on south side Pennsylvania avenue, between Thirteenth and Thirteenth-and-a-half streets; 1 on north side Pennsylvania avenue, between Eleventh and Twelfth streets; 1 on south side Pennsylvania avenue, between Tenth and Eleventh streets; 1 on northeast corner Tenth and D streets; 1 on south side Pennsylvania avenue, between Eighth and Ninth streets; 1 on south side Pennsylvania avenue, between Seventh and Eighth streets; 1 on southeast corner Eighth street and Market space; 1 on south side Pennsylvania avenue, between Four-and-a-half and Sixth streets; 1 on south side Pennsylvania avenue, between Third and Four-and-a-half streets; 1 on corner Fourteenth and B streets; 1 on corner Fourteenth street and Ohio avenue; 1 on corner Fourteenth and D streets; 1 on corner Fourteenth and E streets.

Southeast.—One on corner Pennsylvania avenue and Third street; 1 on Pennsylvania avenue, between Third street and North Carolina avenue; 1 on corner Pennsylvania avenue and Fifth street; 1 on Pennsylvania avenue, between Seventh and Eighth streets; 1 on Pennsylvania avenue, between Sixth and Seventh streets; 1 on corner Pennsylvania avenue and Tenth street.

ADDITIONAL ARC LAMPS LIGHTED DURING FISCAL YEAR 1898, AND MAINTAINED BY THE POTOMAC ELECTRIC POWER COMPANY.

Northwest.—One on Four-and-a-half street, between C and D streets; 1 on corner Four-and-a-half and C streets; 2 on Four-and-a-half street, between Pennsylvania avenue and C street; 1 on Four-and-a-half street, between Pennsylvania avenue and Missouri avenue; 1 on corner Fifth street and Massachusetts avenue; 1 on north side Pennsylvania avenue, between Madison and Fifteenth streets; 1 at intersection of New Hampshire avenue and M street; 1 on M street, between New Hampshire avenue and Twenty-second street; 1 on corner Twenty-second and M streets; 1 on M street, between Twenty-second and Twenty-third streets; 1 on corner Twenty-third and M streets; 1 on M street, between Twenty-third and Twenty-fourth streets; 1 on corner Twenty-fourth and M streets; 2 on M street, between Twenty-fourth and Twenty-fifth streets; 1 on corner Twenty-fifth and M streets; 1 on M street, between Twenty-fifth and Twenty-sixth streets; 1 on corner Connecticut avenue and I street.

A great improvement in the lighting of Pennsylvania avenue from Eleventh street east to Rock Creek has been made by the addition of sixteen lamps and the readjustment and relocation of the old ones. All the old poles were also taken down and new ones of a very ornamental character substituted, with the lamps suspended on a 9-foot arm over the roadway. From Second to Eleventh street SE. the posts were removed from the south curb and placed in the parking in the center of the avenue, with the lamps suspended over both roadways. This work was done at the expense of the United States Electric Lighting Company, at the suggestion of the department, and greatly improves the appearance of the avenue.

Two hundred and fifty of the old square street sign frames used on the abandoned gas posts along the line of the electric arc lamps were replaced with ornamental scroll frames. Although somewhat more expensive than the old style, they are very ornamental and present a neat appearance on the posts. About one hundred more of the corners will be equipped with these frames this coming year.

Where arc lamps existed along the conduit lines of both companies, a material reduction in price resulted, the figures being so low, however, that they can not be used as a basis for estimates. They are below the actual cost of furnishing the service and will be temporary only. Where but one set of conduits existed the full price allowed by law was paid.

The location of the lamps on which such a cut was made is as follows:

Twenty-four in Georgetown at \$25 per lamp per annum; 3 on New York avenue, between Thirteenth and Fourteenth streets, at \$25 per lamp per annum; 3 on Pennsylvania avenue, between Madison and Jackson places, at \$25 per lamp per annum; 2 on one post, corner of Thirteenth and H streets, at \$20 per lamp per annum.

These thirty-two lamps were maintained by the Potomac Electric Power Company during the year 1897; during the year 1898 they were maintained by the United States Electric Lighting Company.

It is urgently recommended that the arc lamps be lighted earlier in the evening by at least half an hour, for on cloudy nights it is quite dark at forty-five minutes after sunset (the time now required by law for lighting the lamps). It would be better still to return to the sunset-sunrise schedule, which is almost universally used in other cities. The arc lamps are placed on streets where there are rapid transit lines and where plenty of light is required.

164 OPERATIONS OF THE ENGINEER DEPARTMENT, D. C.

The following is a statement of the expenditures for the department for the year:

Financial statement for the fiscal year 1898.

STREET LIGHTING.

RECEIPTS.

Appropriation	\$160,000.00
Received from Baltimore and Potomac Railroad for maintenance of lamps along their tracks	3,000.00
Received from Baltimore and Ohio Railroad for maintenance of lamps along their tracks	439.93
Total	163,439.93

EXPENDITURES.

Gas lighting:		
Washington Gaslight Company	\$115,824.79	
Deductions for defective service	136.23	
		\$115,688.56
Georgetown Gaslight Company	9,043.65	
Deductions for defective service	34.44	
		9,009.21
Naphtha lighting:		
Pennsylvania Globe Gaslight Company	23,972.79	
Deductions for defective service	62.05	
		23,910.74
Incandescent lighting:		
Potomac Electric Power Company	4,885.59	
Deductions for defective service	135.51	
		4,750.08
Erecting new lamps:		
Washington Gaslight Company	1,170.00	
Georgetown Gaslight Company	45.00	
Pennsylvania Globe Gaslight Company	664.00	
		1,879.00
Moving and resetting lamps:		
Washington Gaslight Company	228.00	
Georgetown Gaslight Company	40.00	
Pennsylvania Globe Gaslight Company	18.00	
		286.00
Reerecting broken posts:		
Washington Gaslight Company	40.00	
Georgetown Gaslight Company	10.00	
Pennsylvania Globe Gaslight Company	4.00	
		54.00
Taking down old posts:		
Washington Gaslight Company	97.50	
Georgetown Gaslight Company	16.50	
Pennsylvania Globe Gaslight Company	4.00	
		118.00
Changing lamps from naphtha to gas:		
Washington Gaslight Company	846.00	
Georgetown Gaslight Company	12.00	
		858.00
Services:		
Skilled laborer	492.50	
Painter	49.90	
Laborer erecting enamel signs	26.25	
		568.65
Lamp posts		1,887.22
Special lanterns		18.00
Collis sign lamps		356.10
Ornamental scroll sign frames		2,029.20
Square copper sign frames		130.00
Glass street signs		225.30
Enamel street signs		65.52
Repairs to cuts in pavements		691.50
Carting lanterns, frames, etc.		480.60
Carting lamp posts		253.03
Miscellaneous		13.32

Total **163,272.03**

ELECTRIC LIGHTING.

RECEIPTS.

Appropriation	\$55,000.00
Received from Baltimore and Potomac Railroad for maintenance of lamps along their tracks.....	456.25
Total	55,456.25

EXPENDITURES.

Arc lighting:	
United States Electric Lighting Company	\$39,680.00
Deductions for defective service.....	204.40
	\$39,475.60
Potomac Electric Power Company.....	12,020.75
Deductions for defective service.....	45.07
	11,975.68
Repair and purchase of bicycles.....	151.02
Purchase of testing instruments.....	772.35
Salaries of inspectors.....	2,694.25
Office furniture.....	211.50
Miscellaneous.....	22.65
Total	55,303.05

Very respectfully submitted.

WALTER C. ALLEN,

Inspector of Electric Lighting, in Charge of the Street Lighting Department.

Capt. LANSING H. BEACH,

Corps of Engineers, U. S. A.,

Engineer Commissioner District of Columbia.

REPORT OF THE INSPECTOR OF ELECTRIC LIGHTING.

WASHINGTON, D. C., August 15, 1898.

SIR: I have the honor to submit the following report of the various branches of electrical work under the control of this office:

CONDUITS.

The record of conduits in the last annual report was brought up to September 1, 1897. Since then the amount laid has been as follows:

Under permit dated September 30, the Chesapeake and Potomac Telephone Company replaced their old solid asphalt conduit from Ninth and E streets along E street to Eighth and up Eighth street to the Post-Office Department building, by laying 406 feet of 4-way terra-cotta conduit and 29 feet of 4-inch iron pipe, with 2 manholes. Also, under date of November 18, they replaced the last of the old solid-system conduit by laying 209 feet of 2-way terra-cotta conduit, 169 feet of 4-inch terra-cotta pipe, and one manhole, from the northeast corner of Vermont avenue and K street along Vermont avenue into the alley in square 217.

The destruction of the cable power house of the Capital Traction Company by fire in September, 1897, resulted in the change of motive power on the line from cable to an underground electric system similar to that employed by the Metropolitan Railroad Company. The following amount of conduit was laid to carry their feeder cables:

TABLE I. Table showing the length of conduit laid by the Capital Traction Company.

	Section of road.			Total feet of conduit.	Total feet of duct.
	Pennsylvania avenue.	Fourteenth street.	Seventh street.		
Cement-lined iron pipe:					
26-way	280			280	7,280
22-way	9,109			9,109	200,398
14-way	4,257			4,257	59,598
8-way	194			194	1,552
7-way			29	29	203
6-way			179	179	1,074
4-way	30		85	65	260
Camp single terra cotta:					
8-way	2,567			2,567	20,536
6-way		7,141		7,141	42,846
4-way		6,212		8,655	34,620
2-way			7,650	7,650	15,300
Terra cotta 2-way duct			8,092	8,092	16,184
Total	22,649	9,584	15,985	48,218	399,851

Section of road.	Cement lined.	Terra cotta.	Multiple terra cotta.	Total of conduits.	Sewer connections, 6-inch pipe.	Man-holes.
Pennsylvania avenue	13,870	8,779		22,649	1,475	96
Fourteenth street		9,584		9,584	728	53
Seventh street	243	7,650	8,092	15,985	906	52
Total feet of conduit	14,113	26,013	8,092	48,218	3,109	181

One hundred and twenty-six feet over the M Street Bridge not included in totals.

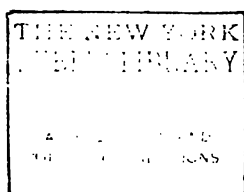
Under the terms of the appropriation act for the fiscal year 1897 the United States Electric Lighting Company extended their underground lines in Columbia and Washington heights by building lateral conduits in numerous streets, as shown by the following table:

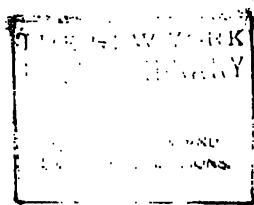
Length of conduit laid in Washington and Columbia heights by the United States Electric Lighting Company during 1898.

Location.	Date laid.	Ducts.	Potomac multiple terra cotta.	Camp single terra cotta.	Manholes.		Hand-holes.
					Large.	Medium.	
Bancroft place	Mar. 7 to 11	4		616	2	4	
California avenue	Apr. 25 to 30	4		862	2		1
Le Roy place	Apr. 27 to May 2	4		688	1	2	3
Columbia road	May 3 to 10	4		1,402	4	2	1
Roanoke street	May 5 to 11	4		654	2		1
Yale street	May 9 to 11	4	688		2		2
Princeton street	May 10 to 12	4	717		2		2
Harvard street	May 12 to 14	4	744		2		2
Bacon street	May 13 to 16	4	671		2		2
Binney street	May 14 to 18	4	669		2		2
Chapin street	May 16 to 19	4	737		1	2	
Total feet of conduit			4,226	4,222	22	10	16
Total feet of duct			16,904	16,888			



CORNER NINTH AND D STREETS NW. MAY, 1898.







ALLEY BETWEEN FOURTEENTH, FIFTEENTH, F, AND G STREETS NW. APRIL, 1898.

As a further extension of their conduit system to Columbia Heights under the authority of the same appropriation act, the company claimed the right to build conduits up Ninth street from Mount Vernon square to Florida avenue, to Thirteenth street, to and into Columbia Heights. This extension was opposed by the Potomac Electric Power Company, and briefs were filed with the Commissioners by both sides in support of their claims. The matter was referred to the attorney for the District for an opinion, who stated that the Commissioners could issue the permit under the law. This was accordingly done, and work was begun. While this was in progress the company applied for other extensions of their system on other streets, but the issuance of permits was prevented by an injunction obtained by the Potomac Electric Power Company, which also included any further work on the Ninth street line. After a thorough trial in the court, a decision was rendered favorable to the Potomac Company and the injunction made permanent. At the time the work was stopped 5,102 feet of 4-way single terra-cotta pipe had been laid, 12 large and 13 medium manholes built, and 5 medium and 1 large manholes not completed, leaving the conduit practically completed as far north as U street. With the consent of both parties and under authority of the court, the uncovered trench was refilled and paved over, so as not to obstruct travel on the street. On July 1, 1898, the conduit had not been legalized by act of Congress nor the decision of the court reversed. It was, therefore, not in use on that date.

During the autumn of 1897 the street department widened the roadway of Tenth street from D to F street by moving the curb lines back $6\frac{1}{2}$ feet on each side. In the west sidewalk the United States Electric Lighting Company had a 6-way conduit, over which the new curb would be laid. It was therefore necessary to rebuild the conduit and manholes on a new line, which was done at the expense of the District. An overhead pole line also existed there between D and E streets, which was removed and the various services laid under ground. The conduit was enlarged from 6 to 8 ducts, the District paying the following amount for the work, the cost of the extra ducts being borne by the company:

Labor, laying 962 feet of conduit, at 55 cents	\$529.10
962 feet of 6-way terra-cotta pipe, at 24 cents	230.88
5 large manholes, at \$35	275.00
2 medium manholes, at \$35	70.00
6 small manholes, at \$10	60.00

Total 1,164.98

A 1-way conduit of the United States Electric Lighting Company, running northward on Brightwood avenue from Florida avenue to a point 133 feet distant, was repaired and replaced by 4 ducts.

Under permit dated October 6, 1897, the same company repaired their old 6-way conduit, on the west side of Thirteen-and-a-half street, by laying 24 additional ducts around the old construction. This new construction amounts to 1,060 feet of conduit, containing 25,440 feet of terra-cotta duct. Also, under permit dated November 30, 1897, they rebuilt their 12 way conduit on the north side of C street from Thirteen-and-a-half to Ninth streets by abandoning the old construction and laying 36 ducts in the south sidewalk. The new conduit is 1,925 feet long, containing 69,320 feet of terra-cotta duct. The overhead lines on both Thirteen-and-a-half street and C street are to be removed and the wires placed in the conduits. The work of removal is now under way and will be completed during the month of August, 1898.

In order to connect their old power house with the new, this company has laid 106 feet of 64-way conduit, containing 6,784 feet of duct, in the north side of B street, between Thirteen-and-a-half and Fourteenth streets. Connecting their storage-battery room with their new plant, they have laid 30 feet of 12-way and 65 feet of 24-way conduit, containing 1,920 feet of duct. To connect their existing conduit in the north sidewalk of B street with their new plant, they have laid 38 feet of 24-way conduit, containing 912 feet of duct.

The Postal Telegraph-Cable Company was granted a permit to rebuild their conduit (consisting of a single 4-inch iron pipe) on Fourteenth street, from F street to New York avenue. They laid 838 feet of 4-way terra-cotta conduit, containing 3,352 feet of duct. At the point where this conduit crosses that of the Potomac Electric Power Company, at the northeast corner of Fourteenth street and New York avenue, a manhole was built embracing the latter conduit. At the time of the partial destruction of the plant of the United States Electric Lighting Company by fire on the night of November 25, 1897, the Postal Telegraph-Cable Company was deprived of power to run their motor-generators for telegraphic work. To overcome this difficulty cables for carrying current from the Potomac Electric Power Company's lines were drawn into this conduit from the joint manhole mentioned above to the office of the telegraph company, at Pennsylvania avenue and Fourteenth street. This use of telegraph conduits for electric light and power purposes was immediately made the subject of Congressional investigation, as shown by the following Senate document (No. 122, Fifty-fifth Congress, second session):

"Letter from the Commissioners of the District of Columbia in response to resolution of the Senate of January 27, 1898, as to the use of telegraph conduits for electric lighting cable purposes in the District of Columbia.

"February 7, 1898.—Referred to the Committee on the District of Columbia and ordered to be printed.

"OFFICE COMMISSIONERS OF THE DISTRICT OF COLUMBIA,

"Washington, February 7, 1898.

"SIR: In response to Senate resolution of January 27, 1898, 'that the Commissioners of the District of Columbia be, and they are hereby, directed to report to the Senate forthwith whether telegraph conduits are being used for electric light cable purposes in the District of Columbia, and whether lighting wires are being run from such conduits without provision of law,' the Commissioners have the honor to say that the following is the only instance known to them of a connection between an electric-light conduit and a telegraph conduit in the city:

"At the northeast corner of New York avenue and Fourteenth street the conduit of the Potomac Electric Power Company crosses the conduit of the Postal Telegraph-Cable Company. A manhole has been constructed where the two conduits intersect, exposing the side wall of the conduit of the Potomac Electric Power Company. This wall has been broken through where so exposed, and two cables of the Potomac Electric Power Company have been run into the conduit of the Postal Telegraph-Cable Company and drawn through said conduit to the office of the latter-named company on Pennsylvania avenue, between Thirteenth and Fourteenth streets. This connection was made entirely within the manhole of the telegraph conduit, and without disturbing the street pavement. A permit was not obtained from the Commissioners to make the connection. No connection has been made from the electric-light cable in the telegraph conduit to any adjacent premises. With regard to the use of said cables in the building of the Postal Telegraph-Cable Company, the Commissioners have the honor to submit herewith report of the manager of that company.

"The Engineer Commissioner had no knowledge of any proposed action to be taken by said company which involved the drawing in of cables not belonging to the company.

"Very respectfully,

"JOHN W. ROSS,

"JOHN B. WIGHT,

"W. M. BLACK,

"Commissioners of the District of Columbia.

"HON. GARRET A. HOBART,

"President of the Senate."

"POSTAL TELEGRAPH-CABLE COMPANY,

"Washington, D. C., February 5, 1898.

"GENTLEMEN: In reply to your letter of the 1st instant, submitting copy of Senate resolution of January 27, 1898, to wit:

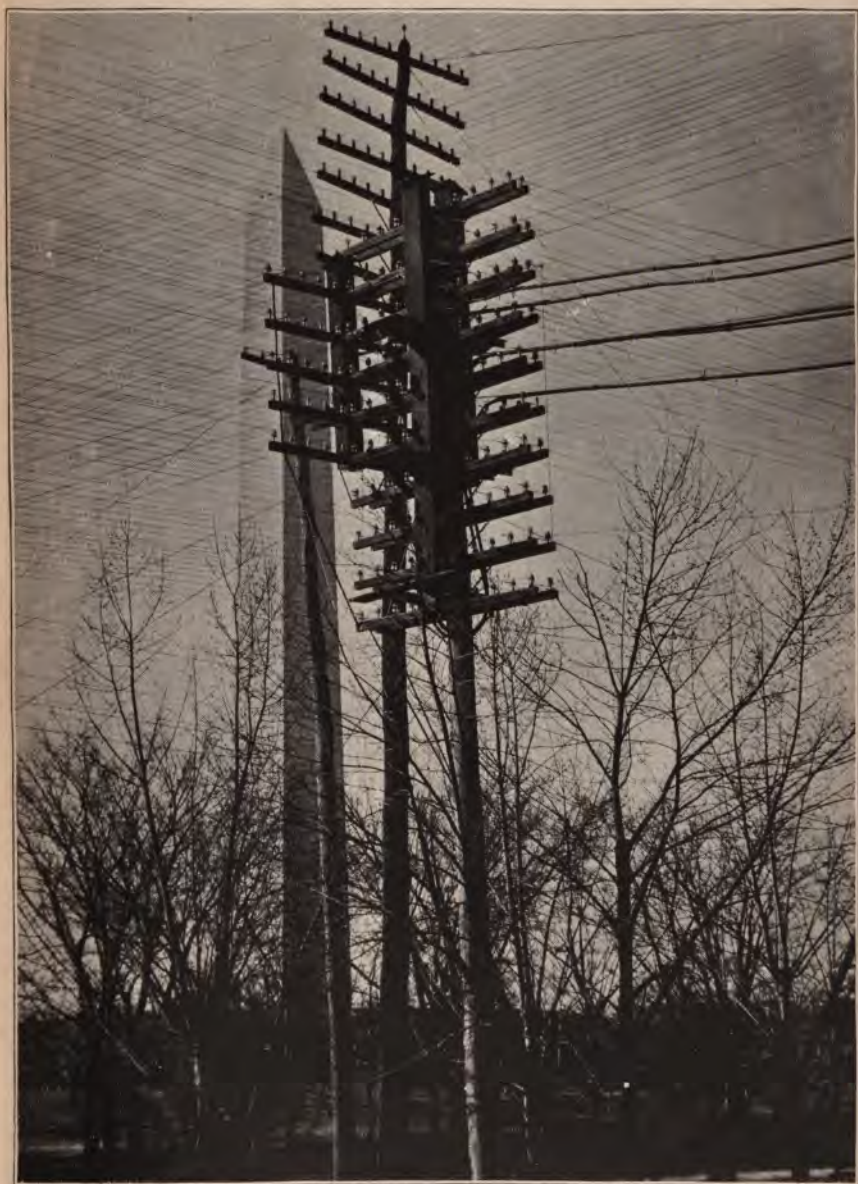
"*Resolved, That the Commissioners of the District of Columbia be, and they are hereby, directed to report to the Senate forthwith whether telegraph conduits are being used for electric-light cable purposes in the District of Columbia, and whether lighting wires are being run from such conduits without provision of law.*"

"I have to say that no present use is made by us of the lighting wires referred to. They were run, after conference between Commissioner Black, Mr. Crosby, of the Potomac Electric Power Company, and myself, in order that an emergency or breakdown service might be at our command. The operation of our lines depends upon motor dynamos, which are run by current supplied by the United States Electric Lighting Company.

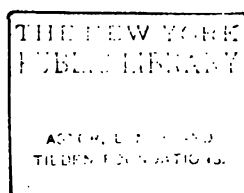
"On the occasion of the recent fire in the station of that company our service was for a time paralyzed, and was suspended and irregular for several days thereafter. It was impossible to know how long a time would elapse before reliable service from the United States Electric Lighting Company could be restored; hence the conference with Commissioner Black and the subsequent drawing in of cable as soon as could be done.

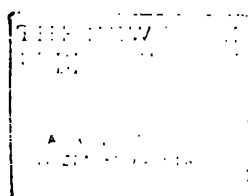
"By the time this was accomplished the service of the United States Electric Lighting Company had been reestablished, and no current has been taken from the Potomac Electric Power Company. It would be possible, however, in case of another such emergency, to connect their wires with our motors.

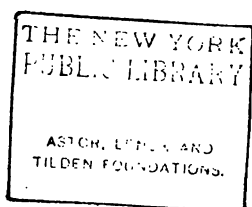
"In the conference with Commissioner Black he stated that the case was one concerning which the law seemed to be silent, but as no special opening of the street was involved he had nothing to say bearing directly on the subject. A permit for repair of our conduit where it crosses that of the Potomac Electric Power Company

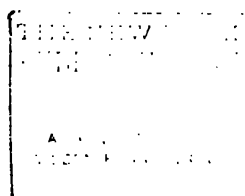


NORTHWEST CORNER OF FOURTEENTH AND B STREETS NW.











OHIO AVENUE, THIRTEEN-AND-A-HALF AND C STREETS NW. MARCH, 1896.

had already been granted, this having been applied for before the fire. Hence no especial opening of the street was required.

"Very respectfully,

"POSTAL TELEGRAPH-CABLE COMPANY,
"W. H. ALLEN, *Manager*.

"The COMMISSIONERS OF THE DISTRICT OF COLUMBIA."

These cables, as stated verbally to me by the Potomac Electric Power Company, are now in use for private electric lighting.

The following table shows the length of conduit in use in the District of Columbia on July 1, 1898:

Summary of conduits, July 31, 1898.

Number of ducts.	United States Electric Lighting Co.		Potomac Electric Power Co.		Postal Telegraph Cable Co.	
	Feet of conduit.	Feet of duct.	Feet of conduit.	Feet of duct.	Feet of conduit.	Feet of duct.
1	10,569	10,569			13,236	13,236
2	123,052	246,104	245	490		
3	98	294				
4	50,145	200,580			1,427	5,708
5	37,974	227,844	9,373	56,238		
6						
7						
8	3,041	24,328				
9			7,288	65,592		
10	88	880				
12	945	11,340	37,900	454,800		
13						
14						
15	68	1,020				
16	78	1,248	1,314	21,024		
17						
18						
19						
20						
23						
24	1,193	28,632				
25						
26						
32						
34	1,837	66,132				
35						
40						
52						
64	106	6,784				
72						
Total	229,194	825,755	56,120	598,144	14,663	18,944

Number of ducts.	Chesapeake and Potomac Telephone Co.		Metropolitan Railroad Co.		Capital Traction Co.		Total.	
	Feet of conduit.	Feet of duct.	Feet of conduit.	Feet of duct.	Feet of conduit.	Feet of duct.	Conduit.	Duct.
1	15,596	15,596					39,401	39,401
2	3,677	7,354			15,742	31,484	142,716	285,432
3							98	294
4	471	1,884	21,608	86,432	8,720	34,880	82,371	329,485
5	23,111	138,666			7,320	43,920	77,778	466,668
6	82	574			29	203	111	777
7	18,090	144,720			2,761	22,088	23,892	191,136
8	114	1,026					7,402	66,618
9							88	880
10							53,617	643,404
12	4,963	59,556	9,809	117,708			212	2,756
13	212	2,756					4,257	59,598
14					4,257	59,598	68	1,020
15							7,217	115,472
16	5,825	93,200					636	10,812
17	636	10,812					1,576	28,368
18	1,576	28,368					26	520
20	26	520					9,109	200,398
23					9,109	200,398	304	7,600
24	304	7,600					3,265	78,360
25	2,072	49,728					280	7,280
26					280	7,280	465	14,880
32	465	14,880					1,863	67,068
36	26	936					1,534	61,360
40	1,534	61,360					749	41,944
50	749	41,944					382	18,048
64	176	11,264					76	5,472
72	76	5,472						
Total	79,781	698,216	31,417	204,140	48,218	399,851	450,493	2,745,051

87.02 miles of conduit, containing 519.87 miles of duct.

Summary of conduits, July 31, 1898—Continued.

	Length of bridges.	Conne- ctions. ^a	Hand- holes.	Man- holes.
United States Electric Lighting Co.....	260	7, 098	2, 351	900
Potomac Electric Power Co.....	126		116	187
Postal Telegraph Cable Co.....				56
Chesapeake and Potomac Telephone Co.....				223
Metropolitan Railroad Co.....	169	61		125
Capital Traction Co.....	126	63, 109		181

^a Exclusive of house connections.^b Sewer connections.

OVERHEAD WIRES.

The overhead-wire situation has improved considerably during the year, both as regards the appearance of the lines and the number of wires removed.

United States Electric Lighting Company.—In October the street department widened the roadway of Tenth street from D to F streets NW., necessitating either the moving of an overhead line of this company to the new curb or the abandonment of the poles and wires. As the conduit was destroyed by the street improvement, a new one was built, with the addition of two ducts to the original number of six, with the agreement on the part of the company to entirely remove the poles and wires. This was done, 8,990 feet of main wire, 1,846 feet of services, and six poles being removed.

This company also had 12,815 feet of wire on the poles of the Western Union Telegraph Company on Fifteenth street from Albaugh's alley to G street. Although the latter company removed their poles and wires from this street, those of the former had to remain, as the conduit capacity was entirely inadequate to hold them. This necessitated the retention of three of the old wooden poles and the replacement of nine others with iron ones. In addition to this, the company removed 3,415 feet of wire. In the alleys in squares 431 and 432, 1,920 feet of overhead mains were removed and the majority of the services placed underground. Some of them, however, were run along the walls of the buildings with an underground connection from a cable pole at the head of the alley. Owing to the removal of the telegraph poles, 10,150 feet of wires were taken down from the Western Union pole line from the corner of Ninth and C streets across Pennsylvania avenue to the corner of Seventh and C streets.

Potomac Electric Power Company.—All overhead wires of this company inside of the city limits have been removed, except two services 2,290 feet long, running principally over house tops and containing 5,230 feet of single wire. Outside of these limits no extensions of their lines have been made, and only three overhead services connected in.

Chesapeake and Potomac Telephone Company.—Under date of May 25, 1897, permit was issued to this company to erect a line of poles on the Military road from Brightwood avenue to Grant road and on Grant road to the Tennallytown road, which was afterwards changed by shifting the line from Military road to the Grant and Broad Branch roads, commencing at a point just west of Rock Creek. Twenty-four poles were erected on Military road west of Brightwood avenue and 11 on Nebraska avenue from the Loughborough road to the Tennallytown road, when further work was stopped by the board of control of Rock Creek Park, as they decided that they had no authority to issue the permit for the erection of the line. In order to get to the west of the park the company obtained permission (permit dated July 13) to erect poles on the Loughborough road from Nebraska avenue to Milwaukee street, and on that street to and across the Chain Bridge. They erected 91 poles and 13 fixtures on the bridge. They also obtained permission to replace 14 poles of the Postal Telegraph Cable Company on the Loughborough road from Nebraska avenue to the Tennallytown road. Under date of September 14, 1897, permission was granted them to replace their pole line on Fourteenth street extended from Brightwood avenue to Piney Branch, consisting of 71 poles, to one of 80 poles; under another permit of the same date to build a new line of poles from Piney Branch to Sixteenth and Howard streets along the Piney Branch road, 18 poles being erected; also, under same date, to replace 12 poles on Columbia road between Fifteenth and Eighteenth streets. This enabled them to connect their line on Brightwood avenue, at the Military road, to the line running to Tennallytown by way of Woodley road, and from Tennallytown to the Chain Bridge.

August 11, 1897, permit was issued to replace four and erect two poles on Binney street between Fourteenth and Fifteenth streets and to replace one and erect three poles on Princeton street between Thirteenth and Fourteenth streets.

September 30, 1897, permit was issued to erect poles on Fifteenth street near Grant street, and a guy pole at the northeast corner of Grant and Pine streets.



CORNER THIRTEEN-AND-A-HALF STREET AND PENNSYLVANIA AVENUE. APRIL, 1898.

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CORNER SEVENTH STREET AND NEW YORK AVENUE NW. APRIL, 1898.

September 30, 1897, permit was issued to erect poles on Brightwood avenue from a point opposite the residence of Mr. Shoemaker to the District line. This work was not allowed to be done, however, as the legality of the permit was questioned in connection with poles on Chapin street, as indicated below.

October 26, 1897, permit was issued to replace three and erect one pole on Grant street between Pine and School streets.

November 1, 1897, permit was issued to replace three and erect three additional poles on Chapin street between Fourteenth and Fifteenth streets and to erect one pole in the alley south of Chapin street between said streets. Objection was raised by residents of Columbia Heights to the erection of the additional poles, and the work was stopped after a portion of the poles had been set. This matter of the erection of additional poles outside of the city limits was referred to the attorney of the District for an opinion, who stated that the Commissioners were without authority to grant such permission. The additional poles on Chapin street were then removed at the request of the Commissioners and the pavement restored to its original condition. Since November 27, 1897 (the date this opinion was rendered and in which the Commissioners concurred), no additional poles outside of the city limits have been erected by the company.

During the year they have rebuilt the following lines, erecting new and substantial poles:

Tennallytown road from Woodley lane to Loughborough road, 33 poles.

Fourteenth street extended from Brightwood avenue to Piney Branch, 70 poles replaced and 10 added.

Columbia road from Fifteenth to Eighteenth streets, 12 poles replaced and 6 added.

Columbia road from Fourteenth to Fifteenth streets, 5 poles replaced.

Maryland avenue from Ninth to Fifteenth streets NE., 18 poles replaced.

Numerous old poles have been replaced with new ones, and many new poles erected in the alleys in the city.

Western Union Telegraph Company.—This company has greatly improved their overhead system by replacing a large number of old poles with new ones and substituting copper for the old iron wire. The work that has been done is as follows:

The removal of their main offices from the corner of Fifteenth and F streets to the new Wyatt Building at the corner of Fourteenth and F streets necessitated a change in the routes of their main lines, which was accomplished by abandoning and removing the two lines of poles and wires on Fifteenth street from B street to Pennsylvania avenue, and one line on Fifteenth street from Pennsylvania avenue to G street, and by building a new line on Fourteenth street from B to G streets and placing the wires in cables. The work done under this permit involved the removal of, approximately, 453,990 feet of overhead wires, the removal of 44 line and 2 guy poles, the erection of 1 guy and 22 line poles, and the stringing of 23,558 feet of aerial cable. These cables are brought to a large pole at the office building, are carried down the pole on neatly arranged brackets, and then pass under the sidewalk through iron pipes to the terminal boards. This construction was the subject of Congressional inquiry, as shown by the following document (Senate No. 176, Fifty-fifth Congress, second session):

"TELEGRAPH POLES ON FOURTEENTH STREET NW., WASHINGTON, D. C.

"March 7, 1898.—Referred to the Committee on the District of Columbia and ordered to be printed.

"*The Vice-President presented the following letter from the Commissioners of the District of Columbia, in response to resolution of the Senate of February 25, 1898, in relation to the erection of telegraph poles carrying overhead wires on Fourteenth street NW., in the city of Washington, D. C.*

"OFFICE COMMISSIONERS OF THE DISTRICT OF COLUMBIA,

"Washington, March 2, 1898.

"SIR: In response to the Senate resolution of February 25, 1898, 'That the Commissioners of the District of Columbia are directed to inform the Senate under what authority of law, and for what reason, telegraph poles carrying overhead wires have been erected on Fourteenth street NW., in the city of Washington,' the Commissioners have the honor to submit the following:

"In November last the Western Union Telegraph Company, having in view the change of their main office from the corner of Fifteenth and F streets NW. to the corner of Fourteenth and F streets, made application for a permit to renew certain poles on Fifteenth street and G street NW., and to replace certain of their wires with aerial cables. The large number of poles and overhead wires in this neighborhood having been a source of many complaints to the Commissioners and of much contention with the companies using them, advantage was taken of the proposed change in the Western Union Telegraph Company's lines to remedy the existing conditions in this section as much as possible under existing law.

"While it is not known that the Western Union Telegraph Company desired to replace its overhead wires by underground conduits, it is known that if they had so desired the Commissioners were without authority to issue them permits for the construction of the necessary conduits. The Western Union Telegraph Company was occupying the streets with its overhead lines under authority of the act of 1866, commonly known as the 'National telegraph act.' This act has been construed by the supreme court of the District of Columbia as pertaining to the District of Columbia to the same extent as it does to other portions of the United States, and the court held that all the municipal authorities had to do with the subject of the erection of poles and the stringing of wires thereon by the Western Union Telegraph Company was to regulate the exercise of the right granted by law—that is, to designate the streets in which poles might be erected, etc.

"Previous to any action by the Commissioners in this particular instance the matter was also submitted to the attorney for the District of Columbia, who was of the opinion that the act of Congress of 1888 with regard to overhead wires in the city of Washington, and its subsequent modification so far as electric light and telephone facilities are concerned, did not apply to telegraph companies which have availed themselves of the privileges of the national telegraph act. He was, therefore, of the opinion that there was no objection to granting the application of the telegraph company in this instance, subject to such regulations with regard to the location of the poles, etc., as might be necessary and proper for public safety. The rights of the telegraph company appearing to the Commissioners to be clear in this case, their authority extended only to a reasonable regulation of these rights, and, as before stated, due advantage was taken of the company's application to improve the overhead conditions in the section bounded by Thirteenth, Fifteenth, B, and G streets NW.

"After a careful consideration of the matter, a permit was issued to the telegraph company to erect certain poles and string thereon certain aerial cables on Fourteenth street and B street to G street NW, and on G street from Thirteen-and-a-half street to Fourteenth street. As a condition of this permit, the Western Union Telegraph Company is to remove a double line of poles on Fifteenth street, from B street to Pennsylvania avenue, and a single line of poles on same street from Pennsylvania avenue to G street, together with a number of other poles at various points and a large mass of single wires carried by these poles and house-top fixtures.

"The net result of these changes will be a reduction of 25 poles in the section referred to, and the substitution of a comparatively small number of aerial cables for a large mass of single wires, amounting in some instances to 129 on a single pole. A considerable improvement will be had in the overhead conditions in this section, when the work now in progress is completed, by the removal of the poles and wires referred to.

"Very respectfully, yours,

"JOHN W. ROSS,

"President Board of Commissioners.

"HON. GARRET A. HOBART,

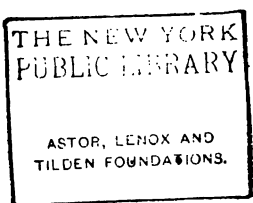
"President of the Senate."

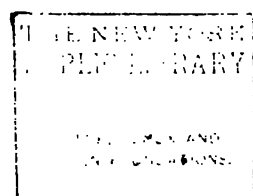
From Fourteenth and G streets NW. to Fifteenth and H streets NE. their old poles were replaced, the line materially strengthened, and on Florida avenue between New York avenue and Fifth street NE. removed to the south side of the avenue, thus avoiding crossing the avenue twice. One hundred and five poles were replaced. The branch line running to the State, War, and Navy Departments by way of B street, Seventeenth street, and New York avenue, was renewed, 20 old poles being replaced. Application was made by the company for permission to renew the line on C street from Thirteen-and-a-half street to Four-and-a-half street and through alleys to the Baltimore and Ohio depot at New Jersey avenue. At the request of the Commissioners, however, they agreed to consolidate that portion of the line on C street between Thirteen-and-a-half and Sixth streets with the line on B street between the same points, renewing the poles on the latter street as well as on the balance of the route. This work was under way at the close of the fiscal year. It was completed by July 31, the following amount of work being done: Forty-four line poles and 1 guy pole replaced; 2 line poles and 1 guy pole erected; 16 old poles removed.

Mutual District Messenger Company.—This company has continued its illegal stringing of wires, although only in one instance has it been detected and stopped. This was in Washington Heights, where two wires were strung from Wyoming avenue and Eighteenth street to Prospect avenue and Crescent street. They were stopped by the police during the work, but managed, nevertheless, to complete it. It was not until peremptorily ordered to do so by the Commissioners that they removed the wires. They have declined to give the Commissioners a proper, accurate, and intelligible description of the routes followed by their wires, for the reason that they prefer not to have it known where they have installed the burglar-alarm and call-box system. No adjustment nor control of their wires can be had unless their location is known.



CORNER NORTH CAPITOL AND B STREETS. APRIL, 1898.







SMITHSONIAN BUILDING FROM THE SOUTH. MARCH, 1898.

FIRE ALARM TELEGRAPH AND POLICE TELEPHONE SYSTEMS.

During the year a complete set of maps has been prepared showing the location of the District lines and the route of each circuit of the District fire alarm and telephone systems. This was completed in April, 1898, and the following table made from the records at that time. Since then several minor changes in some circuits have been made, but these will not materially affect the results.

Table showing the length of wire of the District fire alarm and police telegraph system and the amount on the poles of the various companies.

	Washing- ton.	George- town.	County.	Total.	
				Feet.	Miles.
	<i>Feet.</i>	<i>Feet.</i>	<i>Feet.</i>		
Chesapeake and Potomac Telephone Co.	556,150	38,500	126,160	720,810	136.52
District of Columbia	635,795	56,300	119,640	811,735	153.73
Western Union Telegraph Co.	65,770	15,750	116,160	197,680	37.44
Postal Telegraph-Cable Co.	22,760	-----	19,800	42,560	8.06
United States Government	5,270	800	67,100	73,170	13.86
Railroads	13,700	-----	26,200	39,900	7.56
House tops	91,165	7,950	3,850	102,965	19.50
Arsenal grounds	1,500	-----	-----	-----	-----
Navy-Yard Bridge	9,800	-----	-----	-----	-----
Pennsylvania Avenue Bridge	1,500	-----	-----	-----	-----
Total { Feet.	1,403,410	119,300	478,910	2,001,620	-----
{ Miles	256.79	22.59	90.71	-----	379.09

Since the declaration of war with Spain it has been necessary to string many wires to provide adequate service for the various Executive Departments. This has been done only by the Western Union Telegraph Company and by the United States Government, but as no permits were issued and the work not supervised by this department, no record has been made in this increase in the overhead construction. No new pole lines were constructed, however, the existing lines being used in every case.

A map of that portion of the District inside the fire limits, showing the main lines of overhead wires, is submitted with this report. A few of the trunk lines have been extended to the margin of the map; they exist, however, in nearly every case as far as the District line. Several photographs are also inserted to show some of the overhead conditions.

Number of telegraph and telephone poles in the District of Columbia.

	Inside city limits.		Outside city limits.		Total.	
	Line poles.	Guy poles.	Line poles.	Guy poles.	Line poles.	Guy poles.
District of Columbia	607	17	294	5	901	22
Chesapeake and Potomac Telephone Co.	1,126	143	1,318	99	2,444	242
Western Union Telegraph Co.	543	4	899	2	1,442	6
Postal Telegraph-Cable Co.	107	-----	366	6	473	6
United States Government	56	-----	243	-----	299	-----
Printing Telegraph Co.	-----	-----	63	-----	63	-----
Railroads	106	-----	416	-----	522	-----
Total	2,545	164	3,599	112	6,144	276

ELECTROLYSIS.

In October, 1897, a second report on the subject of electrolysis was submitted, with numerous diagrams and tables showing the results of the tests made by the department. This report was printed for the use of the Senate Committee on the District of Columbia, and subsequently embodied in their report on Senate bill 3647, "For the protection of subsurface pipes, cables, wires, and other metallic constructions in the District of Columbia from damage from electrolysis," which bill was submitted to the Commissioners. This report is Senate Report No. 675, Fifty-fifth Congress, second session. Since making the second report referred to above, several instances of destruction to pipes have occurred and numerous tests have been made. These are inserted here so as to furnish a complete account of this subject to date and as a supplement to the printed report.

WASHINGTON, D. C., February 1, 1898.

SIR: I have the honor to submit the following report of additional tests made in the District in relation to the electrolysis of underground pipes and cables:

The Washington Gaslight Company have a 3-inch pipe running from the Standard Oil Company's works at the corner of Half and K streets SE., through a pump and receiving tank at the corner of First and L streets SW. to receiving and overflow tanks at the intersection of New Hampshire and Virginia avenues NW., following the route shown by red line on the accompanying map. This pipe line is used to convey naphtha from the Standard Oil Company's tanks to the works of the gas company at New Hampshire and Virginia avenues, when the river is so blocked with ice that barges can not be brought up to the company's wharf. In December, 1897, while attempting to pump naphtha through the line, leaks were developed at Four-and-a-half street and Virginia avenue SW., and on Virginia avenue between Third and Four-and-a-half streets. So great was the leak at the latter point that considerable naphtha flowed through the ground and became ignited by a match carelessly thrown down by a boy. A fire resulted, burning up several panels of the fence inclosing the tracks of the Baltimore and Potomac Railroad Company. The latter company sent a bill for damages to the amount of \$45.60 to the gas company, which bill has been paid. Upon excavating, the gas company found two lengths of pipe eaten out, both of which they have replaced.

Figure 1 is a photograph of a section of the pipe taken from the northwest corner of Four-and-a-half street and Virginia avenue, showing the hole eaten out by the current. Figure 2 is a photograph of a section of the pipe taken out from the other location between Third and Four-and-a-half streets, where the fire occurred, showing two holes which were directly under two small water-service pipes crossing the oil pipe at right angles.

On the afternoon of January 4, 1898, the pipe line at Four-and-a-half street and Virginia avenue was uncovered and readings taken. Before unjointing, the oil main was found to be from one-half to 1 volt positive to the water main, one-half to 1 volt positive to the negative return of the Potomac Electric Power Company; one-third to one-half volt positive to the rails of the Metropolitan Railroad Company; one-third volt positive to the lead cover of the cables of the latter company. After unjointing, the difference of potential between the two ends of the pipe was steadily 1 volt toward the west. An ammeter inserted in series with the pipe line showed a flow of 4 amperes toward the west. The water main was one-half volt positive to the return of the Potomac Electric Power Company. At night the conditions changed considerably, owing to the current from the latter company's cables. The oil main changed to $2\frac{3}{4}$ to $3\frac{1}{4}$ volts negative to the return of the latter company, with a difference of potential between the two ends of the pipe of from $3\frac{1}{4}$ to 4 volts in the same direction as before, and with an increase of current to 6 amperes.

Two days after (January 6, 1898), the old main was uncovered on Virginia avenue between Third and Four-and-a-half streets and similar tests made, this time in the presence of the superintendent of the Potomac Electric Power Company. In the daytime the oil main was found one-third to one-half volt positive to the return of the Potomac Electric Power Company; one-third to one-half volt positive to the tracks of both the Metropolitan Railroad and the Baltimore and Potomac Railroad, and $1\frac{1}{2}$ to 2 volts positive to the water-service pipes. The difference of potential between the two ends of the pipe was $1\frac{1}{2}$ volts toward the west, with a flow of $2\frac{1}{2}$ to 3 amperes. At night the readings were, oil main 1 volt positive to water services, 4 to $4\frac{1}{2}$ volts negative to the return of the Potomac Electric Power Company, with a difference of 1 volt between ends of the pipe and a current of 6 amperes through it.

On the same afternoon tests were made at the receiving tank of the naphtha at the intersection of New Hampshire and Virginia avenues. The pipe where it enters the tank was disconnected, and a difference of $3\frac{1}{2}$ volts found between it and the tank. On inserting an ammeter a current of 8 amperes was obtained. The workmen at this place refused at first to disconnect the pipe, as they had noticed sparking there a few weeks before when making other connections, and were afraid to work above the tank, which is 10 feet in diameter and 10 feet high, and was full of naphtha. The joint was bridged around, however, before breaking it, so as to prevent any sparking.

On the afternoon of January 29, 1898, the pipe line was uncovered at First street and Delaware avenue SW. and the pipe cut. It was found to be two-thirds volt positive to the water main, with $1\frac{1}{2}$ volts between ends and a current of 2 amperes toward the north. The pipe was also unjointed at the pump at the corner of First and L streets SW., where a difference of potential of 1 volt and a current of 2 amperes were found. No tests were made at these two points at night.

As the investigation of this case is not yet completed, no positive theory can be advanced concerning it. It can be stated, however, that during the nighttime when the arc lamps maintained by the Potomac Electric Power Company are burning and considerable current is being sent through their cables in Four-and-a-half street, that



FIGURE 1. SHOWING SECTION OF 3-INCH IRON GAS
MAIN REMOVED FROM CORNER OF FOUR-AND-A-
HALF STREET AND VIRGINIA AVENUE SW.

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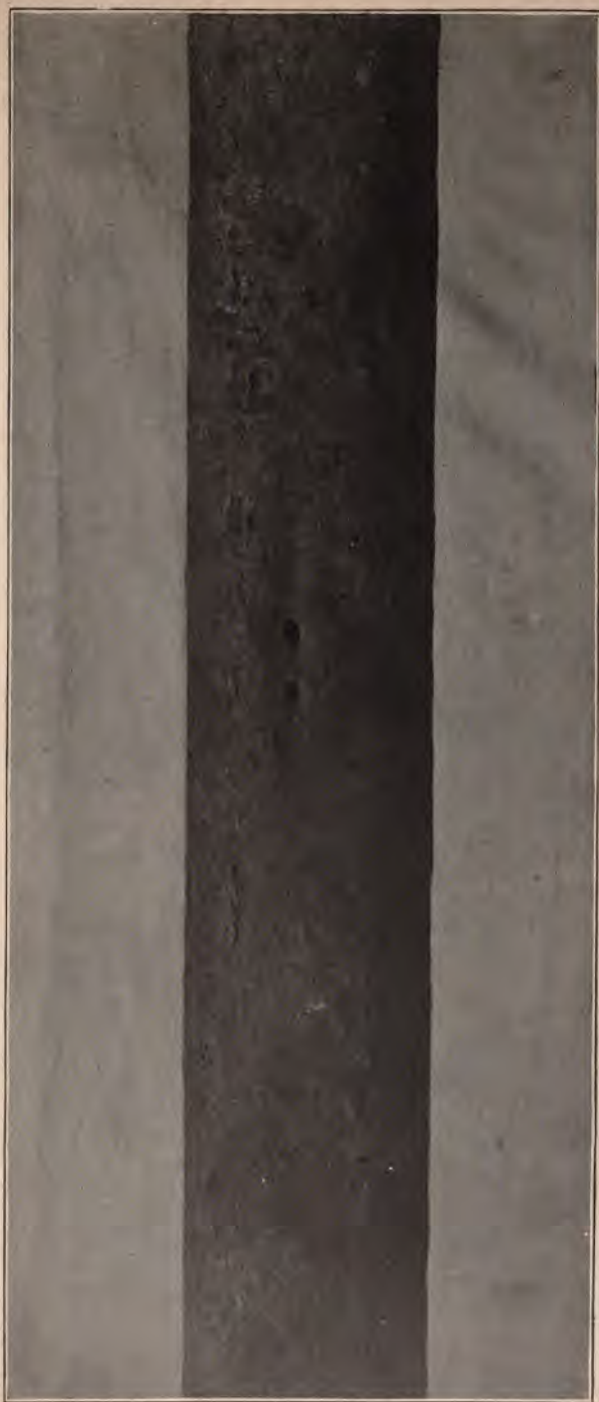


FIGURE 2. SHOWING SECTION OF 3-INCH IRON GAS MAIN REMOVED FROM VIRGINIA AVENUE BETWEEN THIRD AND FOUR-AND-A-HALF STREETS SW.

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the conditions in the pipe line are materially changed, a great amount of current being present. The receiving tank at the corner of First and L streets SW. is 20 feet in diameter and 12 feet high. The receiving and overflow tanks at New Hampshire and Virginia avenues are, respectively, 10 feet by 10 and 20 feet by 10. The tanks present a large surface area in contact with the ground, and, being connected by a pipe line, the joints of which are screw joints and therefore well connected electrically, form an easy path for any current seeking a return through other paths than those provided for it. The larger amount of current at New Hampshire and Virginia avenues and its flow in a westerly direction toward the station of the Potomac Electric Power Company tend to show that the current found in the pipe line is generated there.

Other evidence of electrolytic action has recently been brought to light by the destruction of the lead-covered cables of the Chesapeake and Potomac Telephone Company at Twenty-second and G streets NW. A portion of the conduit system of this company ends at the above corner, from which the wires run overhead to the corner of Twenty-ninth and K streets. At the latter corner, where another set of underground cables ends, the company have bonded the lead covers to the tracks of the Baltimore and Ohio Railroad, to which the Potomac Electric Power Company have also connected the negative pole of their generators. The telephone cable recently drawn into the G street conduit to the corner of Twenty-second street has been badly eaten up, and to protect it the company have just run a heavy copper wire from this latter corner to Twenty-ninth and K streets, and have connected it to the lead cables and the Baltimore and Ohio tracks. I have not seen the results of the tests at Twenty-second and G streets made by Mr. Crandall, electrician for the telephone company, but they will undoubtedly be furnished to the Commissioners if asked for. It would be well, I think, to have them on record, since this department has not yet had an opportunity to make any at that point.

The following extract is taken from the *Electrical World* of November 13, 1897:

"Canadian notes.

"OTTAWA, ONTARIO, November 8, 1897.

"The director of the Meteorological Observatory at Toronto has interviewed the Government in respect to the proposed removal of the magnetic instruments in the observatory to another location. A spot about 9 miles from Toronto has been selected, which will be free from the influences of the electric railway system which has destroyed the usefulness of the observatory in Toronto."

Respectfully submitted.

WALTER C. ALLEN,
Inspector of Electric Lighting.

Capt. W. M. BLACK,
Engineer Commissioner, District of Columbia.

WASHINGTON, March 29, 1898.

SIR: Since making a supplemental report on electrolysis (dated February 1, 1898), several other instances of destruction to pipes have occurred and one formal complaint made to the Commissioners.

On February 9 tests were made on the lead cable of the telephone company at Twenty-ninth and K streets NW. to see if the conditions found there during the day were changed by the turning on of the public arc lamps at night. As stated in my printed report, the telephone cables at this point carry a great deal of current, being bonded to the rails of the Baltimore and Ohio Railroad on K street. At noon, when the output at the station of the Potomac Electric Power Company was 625 amperes, the cables were returning 60 amperes through this track connection. At 7 o'clock p. m. of the same day, after the arc lamps were lighted, when the output was 1,000 amperes at the station, the current in the cables remained the same. The arc-light circuits of the Potomac Electric Power Company were well insulated at that time, as were their other circuits not connected to trolley roads. The conclusions to be drawn from this are that the current found in the cables is due to the grounded return of these roads.

On February 24 another test was made at Twenty ninth and K streets, at which time the Potomac Electric Power Company were not supplying current to the Brightwood Railroad. A considerable reduction in the amount of current in the cables was perceptible, the maximum reading being 20 amperes, one-third of the previous amount.

On March 28 a lead water-service pipe to premises 3330 M street NW. was removed and found badly eaten. This service was laid sometime in June or July, 1897, under permit dated June 10, 1897. A section of this pipe, together with the brass stop-cock now in this office, shows how destructive the action has been.

Another case of corroded lead service pipe was found at 932 K street NW., where a pipe laid in July, 1897, was removed in February, 1898. The iron service pipe in an adjoining house (936 K street NW.) was also badly eaten, and had to be replaced.

The formal complaint mentioned above was made by Frank Fauth, copy of which, together with my indorsement, is attached. The remedy which he says the railroad company made sometime ago was highly objectionable. It consisted in connecting the tracks by a heavy copper wire directly to the water pipes at the company's car barn, thereby forcing the current into the mains, and undoubtedly being the direct cause of the destruction of the lead pipe leading to 3330 M street NW. A means of making a good return for this road was offered the company in September, 1897, but they have so far failed to avail themselves of it. They have, however, removed the connection between their tracks and the mains, which makes the condition at the Foxall road more unfavorable.

Very respectfully,

Capt. W. M. BLACK,
Engineer Commissioner, District of Columbia.

WALTER C. ALLEN,
Inspector of Electric Lighting.

WASHINGTON, D. C., March 24, 1898.

Hon. COMMISSIONERS, Washington, D. C.:

I most respectfully call your attention to the condition of the tracks of the Great Falls Railroad crossing at the intersection of Foxall and Conduit roads, which are exposed to the surface and contain a current of electricity which is dangerous and liable to cause serious accidents to persons crossing in vehicles, by means of horses receiving shocks of electricity when they happen to step on the rails. I am compelled to cross these tracks two or three times a day, and am in danger of my horse running away and causing serious damage both to myself and vehicle.

This same trouble was the cause of much complaint not long ago, and was remedied by the railroad company, but has now returned.

Hoping this will receive your immediate attention and avoid some serious accident, I am,

Very respectfully,

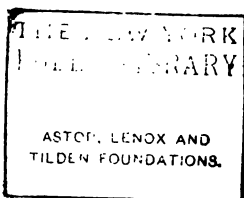
FRANK FAUTH,
Corner Foxall and New Cut Roads, Washington, D. C.

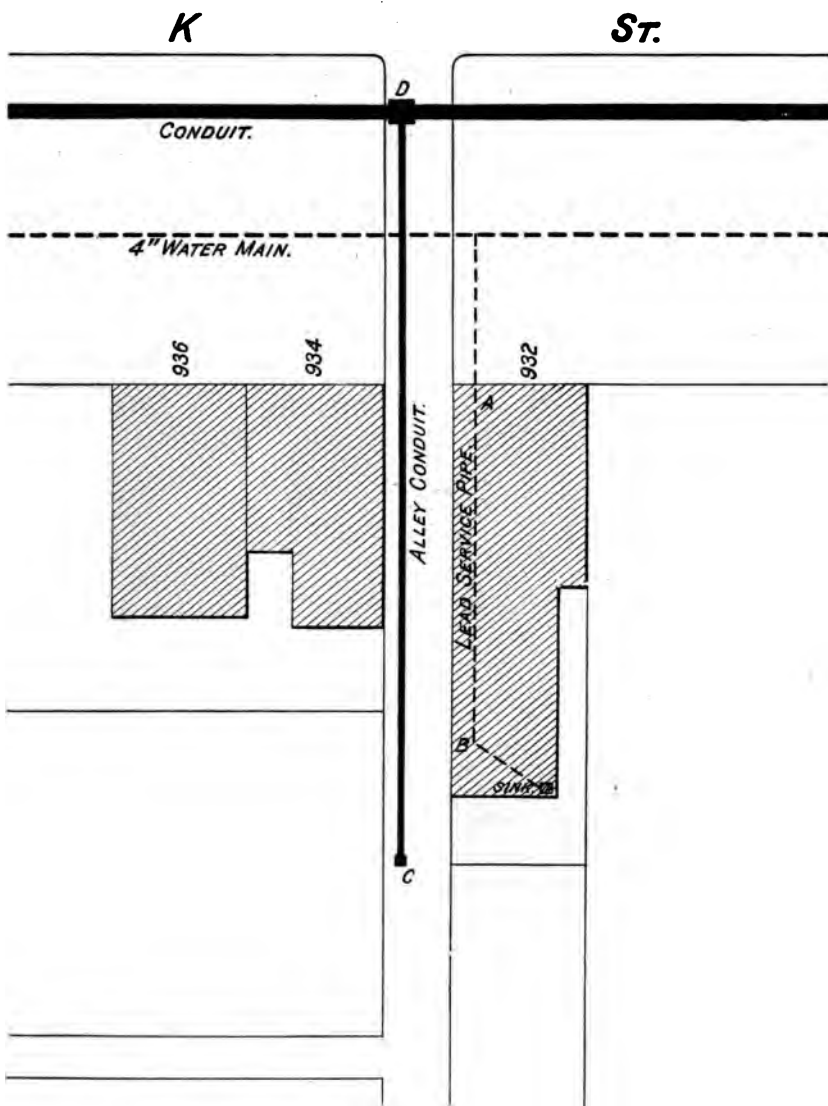
[First indorsement.]

MARCH 24, 1898.

Respectfully forwarded to the Engineer Commissioner, through Captain Burr, with the following report: The Washington and Great Falls Electric Railway Company have within the last few days removed the connection between their tracks and the water mains, which they were requested to do some months ago. While this connection existed, the difference in potential between the tracks and the water-service pipe at the intersection of Foxall and Conduit roads was 15 volts maximum. Tests made on the 23d of this month, after removal of said connection, showed a difference of potential as high as 80 volts at said location. The superintendent of the railroad company informed me that he would put in the grounded connection at Thirty-sixth street between the tracks and the return wire in the Potomac Electric Power Company's conduit this week, which they were ordered to do some months ago. This will remove the danger to horses crossing the tracks at the Conduit road and also relieve the water mains of the burden of carrying the current to the station. Until this is done the undesirable conditions at Foxall road, as stated in accompanying communication, will exist, and under favorable circumstances the voltage at this point is sufficient to give the animals crossing the tracks quite a considerable shock. The policy of delay pursued by this company in complying with the request of the Commissioners of date of September 30, 1897, in reference to the installation of this return wire at Thirty-sixth street should not be further countenanced. I would recommend that they be informed that unless they comply with said request within three days, the work will be done by the District at their expense. Their superintendent informed me that he had sufficient wire on hand to make the required connection, but that his men are employed at other points on the line on work of a pressing nature,

W. C. ALLEN,
Inspector of Electric Lighting.





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TILDEN FOUNDATIONS.

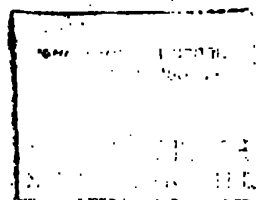


LEAD PIPE REMOVED FROM No. 932 K STREET NW.

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ASTOR, LENOX AND
TILDEN FOUNDATIONS
1907



LEAD PIPE REMOVED FROM No. 932 K STREET NW.



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ASTOR LENOX TILDEN FOUNDATION
111 N. 4th St. New York, N. Y.

WASHINGTON, April 13, 1898.

SIR: I have the honor to report the results of tests made at the premises 932 K street NW., where two lengths of lead service pipe have been eaten out since October 30, 1897, due to electrolytic action. Tests made on the 11th instant showed a flow of current of $1\frac{1}{2}$ amperes in the water-service pipe (which was disconnected by the plumber) and a difference of $8\frac{1}{2}$ volts between the two ends, the direction of the current being from the front to the rear of the premises. An examination of the handhole in the conduit of the United States Electric Lighting Company in the alley (at point marked C on accompanying plat) showed that two of the three service wires were entirely eaten through, and the insulation on the neutral wire gone and the wire itself left bare and under water.

Tests at the manhole (point marked D) at the mouth of the alley showed that there was a cross between the copper of the positive main and the lead sheath of the cable.

A leak was thus established from the positive to the neutral main, the current being carried by the house service pipes from the street to the bare connection in the handhole, and where it left the lead pipe (at B) the corrosion occurred.

In October, 1897, the entire length of lead pipe was renewed, being relaid in the ground. In March, 1898, this was again removed and galvanized-iron pipe run from A along the ceiling of the basement to the sink in the kitchen at the rear of the house. The owner of the premises states that the cost of all this work is over \$100, and that he has made demand upon the United States Electric Lighting Company for damages.

The service wires running down the alley have been disconnected from the mains at the mouth of the alley and the defective portion of the positive main replaced, thus removing the cause of the trouble.

An iron service pipe in premises 936 K street was also eaten out a few months ago, probably due to the same cause.

The attached photograph is a view of a portion of the corroded lead pipe from 932 K street, which was laid in October, 1897, and removed in March, 1898.

Very respectfully,

WALTER C. ALLEN,
Inspector of Electric Lighting.

CAPT. W. M. BLACK,
Engineer Commissioner, District of Columbia.

A bill prepared by the Commissioners for the protection of underground constructions was introduced in Congress at its last session and was passed by the Senate, but failed of passage in the House. An amendment to the District appropriation bill covering the same ground was also made by the Senate and agreed to by the House, but, together with the amendments concerning overhead wires and conduits, was stricken from the bill at its final consideration in conference. This legislation, if passed, would have compelled the several electric roads in the District using the single trolley to substitute the double-trolley system. The only laws regulating the use of grounded circuits now in force are the following police regulations adopted by the Commissioners:

"ARTICLE XVII. SECTION 1. The furnishing of electric light or power on a circuit any portion of which is through a grounded return, or which is intentionally grounded, will not be permitted, excepting in the power stations, cars, and car houses of electric railways, and at street crossings required to be lighted by any railway company under the terms of its charter; nor shall any dynamo with one pole grounded be used to furnish electric light or power except for the purposes above stated.

"SEC. 2. Any person violating any provision of this article shall, upon conviction thereof in the police court, be punished by a fine of not less than \$5 nor more than \$50 for each offense.

"SEC. 3. It shall be unlawful for any feed or return wire that is a portion of any electric circuit used for furnishing electric current for light, heat, or power purposes to be connected to or with any water main or water-service pipe, or any metallic construction directly or indirectly in connection with such main or service pipe. For any violation of this regulation the supply of water will be stopped and will be restored only upon compliance with this regulation and the payment of the cost and expense of turning the water on again."

In granting franchises to street railway companies in the District of Columbia, Congress at its last session inserted the following provisions:

[In amending the charter of the Capital Railway Company (Public, No. 135).]

"That the Capital Railway Company is hereby authorized to install and use the double overhead trolley system on the Navy-Yard bridge for the purpose of propelling its cars across the same."

[In extending the route of the Columbia Railway Company (Public, No. 132).]

"And provided further, That overhead trolleys shall not be used on the lines of said company farther west on said railroad than Fifteenth street northeast. That wherever electric power propulsion is adopted upon the extension herein authorized, or on any other portion of the line of said Columbia Railway Company, no portion of the electric circuit shall be through the earth, but a return circuit of proper capacity and located similarly to the feed-wire circuit shall be provided for the electrical current, and that whenever the trolley system is used, each car shall be provided with a double trolley, and that no earth connection shall be made with any dynamo furnishing power for the road."

[Act incorporating the East Washington Heights Traction Company (Public, No. 148).]

"SEC. 9. That the said company may run its cars by the overhead trolley electric system, or such other electric or mechanical system as the Commissioners of the District of Columbia may approve. * * * *Provided*, That, if electric power by trolley be used, a return wire, similar in capacity and insulation to the feed wire, shall be provided, and each car shall be provided with a double trolley, and no pole of any dynamo furnishing power to the railway shall be connected with the earth."

[An act to incorporate the Washington and University Railroad Company of the District of Columbia (Public, No. 202).]

"SEC. 3. Motive power. That the motive power shall be electricity, and if the trolley system is used, a return wire of equal capacity to the feed wire, and similarly insulated, must be provided, and each car shall be equipped with a double trolley. No portion of the electrical circuit shall, under any circumstances, be allowed to pass through the earth, and neither pole of any dynamo furnishing power to the line shall be grounded."

Very respectfully submitted,

Capt. LANSING H. BEACH,
Corps of Engineers, U. S. A.,
Engineer Commissioner, District of Columbia.

WALTER C. ALLEN,
Inspector of Electric Lighting.

REPORT OF THE INSPECTOR OF GAS AND METERS.

WASHINGTON, June 30, 1898.

SIR: The illuminating power of the gas supplied by the Washington Gas Light Company during the past year has been practically the same as for the year ending June 23, 1897.

The mean average illuminating power determined at the three laboratories was found to equal 25.72 candles, being 0.12 of one candle less than the average found in 1897. The maximum average illuminating power was 29.03 candles, being 0.58 of one candle less than the average found in 1897. The minimum average illuminating power was 22.16 candles, being 0.92 of one candle less than the average found in 1897.

The average illuminating power of the gas determined at the central laboratory, corner Tenth and D streets NW., was found to equal 25.45 candles; the highest illuminating power 28.80 candles; the lowest illuminating power 21.46 candles.

The average illuminating power of the gas determined at the southeast laboratory, corner Fifth and D streets SE., was found to equal 25.91 candles; the highest illuminating power 29.03 candles; the lowest illuminating power 22.65 candles.

The average illuminating power of the gas determined at the northwest laboratory, 1335 Fourteenth street NW., was found to equal 25.80 candles; the highest illuminating power 29.27 candles; the lowest illuminating power 22.38 candles.

On three occasions during the year the average illuminating power of the gas supplied by the Washington Gas Light Company was reported to be less than 25 candles, namely: January 4, 1898, 24.97 candles; January 20, 24.72 candles; April 27, 23.37 candles. On April 28 the illuminating power was 24.99 candles. That being only one one-hundredth of one candle less than the required power, no notice of default was served on the company.

The default reported on April 27, 1898, was the greatest of any deviation from the required standard that has occurred during the past two years, the illuminating power of the gas on that occasion being considerably depressed at all the laboratories.

The average quantity of ammonia found in 100 cubic feet during the year 1898 was 0.66 of 1 grain; being 0.23 of 1 grain less than the average for the year 1897.

The average quantity of sulphur found in 100 cubic feet during the year 1898 was 5.67 grains; being an increase of 1.73 grains over the average for the year 1897. This increase in the quantity of sulphur found in the gas supplied by this company was no doubt due to a larger per cent of coal gas being manufactured during the year 1898, and should not be considered as an objectionable feature in the workings of the company, as I am of the opinion that it is an advantage to have as large a per cent of coal gas in the mixed gases supplied for consumers' use as the company is willing to furnish, notwithstanding that the increased quantity of coal gas manufactured necessitates a correspondingly larger per cent of sulphur to be present in the purified gas.

The law in force in the District of Columbia allows 20 grains of sulphur in every form in 100 cubic feet of gas; so, under the conditions existing during the past year, the quantity of sulphur found is safely within the limits prescribed.

On fifty-eight occasions during the year ending June 24, 1898, the impurity known as sulphureted hydrogen was found to be present in the gas supplied by the Washington Gaslight Company, as follows: Central laboratory, corner Tenth and D streets NW., seven occasions; Southeast laboratory, Fifth and D streets SE., four occasions; Northwest laboratory, 1335 Fourteenth street NW., forty-seven occasions. The above results show a considerable falling off in the presence of this objectionable sulphur compound during the past year. During the year ending June 24, 1897, sulphureted hydrogen was present on one hundred and fifty-five occasions.

The improved facilities that the Washington Gaslight Company possesses at present for the thorough purification of the illuminating gas supplied to consumers is the reason for the favorable change that has occurred regarding this impurity, and it is expected that during the ensuing year sulphureted hydrogen will be entirely eliminated from the gas furnished by this company.

The specific gravity of the gas supplied by the Washington Gaslight Company during the year ending June 23, 1898, was as follows:

Northwest laboratory:

Average	0.613
Highest .....	.656
Lowest .....	.538

Southeast laboratory:

Average .....	.601
Highest .....	.617
Lowest .....	.555

Central laboratory:

Average .....	.608
Highest .....	.646
Lowest .....	.518

The pressure of the gas supplied by the Washington Gaslight Company during the year ending June 30, 1898, was as follows:

Central laboratory:	Inches.
Average mean pressure	1.56
Average maximum pressure	2.02
Average minimum pressure	1.20
Southeast laboratory:	
Average mean pressure	2.06
Average maximum pressure	2.66
Average minimum pressure	1.58
Northwest laboratory:	
Average mean pressure	1.77
Average maximum pressure	2.27
Average minimum pressure	1.40

The above record of pressure was taken between the hours of sunset and sunrise. The gas supplied by the Washington Gaslight Company during the past year, inspected at the Central laboratory, corner Tenth and D streets NW., was found on many occasions to be of less illuminating power than 25 candles, notwithstanding that the monthly averages of this laboratory (with the exception of the months of January, April, and May, when the average power was only 24.97, 24.98, and 24.80 candles) were over 25 candles. On a few occasions similar conditions existed at the Northwest and Southeast laboratories, although the power at the two last-mentioned testing stations was never less than 25 candles by monthly average. I think it more than probable that the cause of the variations referred to was largely due to a want of uniformity in the make of gas at the two manufacturing plants of the company. Unless the output of gas from the Southeast and Northwest gas works is practically of the same illuminating power, considerable difference will at times be found in the results of tests made at the three laboratories located in the southeast, northwest, and central parts of the city. Accidental causes may occasionally arise which

will prevent the illuminating power from being in accord in all parts of the city, but occasions of this kind are not very frequent where ordinary care and prudence are exercised in the make of gas and enrichment of the same.

The illuminating power and purity of the gas supplied by the Georgetown Gaslight Company during the year ending June 23, 1898, was as follows:

The mean average illuminating power, determined at laboratory 1338 Thirty-second street NW., was found to equal 27.78 candles, being 0.59 of 1 candle in excess of the average found in 1897. The maximum average illuminating power was 32.95 candles, being 0.90 of 1 candle in excess of the average found in 1897. The minimum average illuminating power was 23.65 candles, being 0.89 of 1 candle in excess of the average found in 1897.

On seven occasions during the year the illuminating power of the gas supplied by the Georgetown Gaslight Company was reported to be less than 25 candles. On one occasion only was the illuminating power found to be less than 24 candles, namely, October 23, 1897, when the power was only equal to 23.65 candles, the other defaults were only a fraction of 1 candle less than the required standard.

The gas manufactured by this company is a product of coal enriched with oil. It is of fine quality, yielding a light equal to 27.78 candles by average, with a consumption of only 5 cubic feet per hour. On several occasions the gas was so rich that the flame (using the Bray burner No. 7, present standard) was smoky; and as similar conditions are at times likely to exist, I renew the suggestion made in previous annual report, that consumers should use burners with finer openings than formerly, so as to guard against smoky flames.

The average quantity of ammonia found in 100 cubic feet during the year was 3.30 grains, being 0.02 of 1 grain less than the average for the year 1897.

On eighteen occasions, between June 28 and August 2, 1897, the quantity of ammonia found in the gas of this company exceeded the 5 grains allowed in 100 cubic feet. The excess of ammonia was due, so I have been informed, to the fact that the standard scrubber, an apparatus used for the purpose of washing the gas, was out of order and had to be repaired; so it was not until after August 2 that, this object being accomplished, the impurity was again brought within lawful limits.

The average quantity of sulphur found in 100 cubic feet during the year ending June 23, 1898, was 12.23 grains, being 0.61 of 1 grain increase compared with the quantity found during the year 1897.

On five occasions during the year the gas supplied by this company contained sulphureted hydrogen. The presence of this impurity was caused by a breakdown at the works, which could not have been prevented by ordinary care and prudence.

The specific gravity of Georgetown gas, laboratory 1338 Thirty-second street NW., was as follows:

Average	0.514
Highest .....	.572
Lowest .....	.466

The pressure of the gas supplied by the Georgetown Gaslight Company during the year ending June 30, 1898, was as follows:

	Inches.
Average mean pressure	2.01
Average maximum pressure	3.14
Average minimum pressure	1.33

The above record of pressure was taken between the hours of sunset and sunrise.

INSPECTION OF GAS METERS.

During the year ending June 23, 1898, this office inspected and proved 3,241 gas meters.

With the exception of three meters tested for the Alexandria Gas Works, the above-named meters were inspected and proved for the Washington and Georgetown gaslight companies, and for consumers of gas in Washington and Georgetown. One hundred and seventy-two registered fast, average error 4.78 per cent; 506 registered slow, average error 12.47 per cent; 2,440 registered within the limits allowed; and 120 did not register the gas flowing through them.

One thousand and twenty-six of the above-described meters were ordered out of service, being complained of by the gas companies and consumers of gas; 404 were complained of by consumers, they believing them to be incorrect; 156 registered fast, average error 4.88 per cent; 35 registered slow, average error 7.76 per cent; 213 registered within the limits allowed, namely, 2 per cent either way. Six hundred and twenty-two were complained of by the Washington and Georgetown gaslight companies; 14 registered fast, average error 4.60 per cent; 470 registered slow, average error 17.88 per cent; 18 registered within the limits allowed; and 120 did not register the gas flowing through them.

Six hundred and fourteen of the meters complained of by the gas companies were tested for the Washington Gaslight Company. The reason so many were found registering slow and not registering at all is owing to the fact that meters of this class are removed from service by this company, the manager believing them to be incorrect, and before being brought to this office are tested in the company's shop to ascertain their condition. Under the conditions named it is not likely that the inspector would often find meters of this description registering fast or registering within the limits allowed by law.

The sum of \$1,155.10 was collected for the inspection of gas meters by this office during the year ending June 23, 1898. The same was paid to the collector of the District of Columbia.

In the annual reports of this office for the past four years it has been represented that an additional assistant is needed. A suitable person should be appointed at an annual compensation of \$800, whose duties shall be to assist in the laboratory work, inspection of meters, and perform clerical work under the direction of the inspector of gas and meters.

I again renew the recommendation that the salary of the messenger be increased from \$480 to \$600 per annum. The laboratory work performed by this employee, aside from the duties of a messenger, is the reason why this increase is asked.

Respectfully submitted.

S. CALVERT FORD,
Inspector of Gas and Meters.

Capt. LANSING H. BEACH,
*Corps of Engineers, U. S. A.,
Engineer Commissioner District of Columbia.*

Report of the illuminating power and purity of the gas supplied by the Washington Gaslight Company from June 24, 1897, to June 23, 1898.

CENTRAL LABORATORY.

Month.	Number of observations.	Illuminating power in sperm candles.			Quantity of ammonia in 100 cubic feet.			Quantity of sulphur in 100 cubic feet.			Number of occasions that sulphureted hydrogen was present during the year.
		Mean.	Highest.	Lowest.	Mean number of grains.	Highest number of grains.	Lowest number of grains.	Mean number of grains.	Highest number of grains.	Lowest number of grains.	
July	25	25.17	26.88	24.10	0.66	1.27	0.17	5.35	6.96	2.74	7
August	26	25.05	26.03	23.82	.70	1.02	.39	6.32	7.78	4.43	
September	26	25.65	27.39	24.21	.52	.68	.28	6.23	8.19	4.57	
October	26	27.00	28.80	25.24	.37	.68	.17	5.26	7.60	3.20	
November	26	25.44	27.05	23.64	.55	1.13	.22	4.93	5.63	3.67	
December	24	25.10	26.37	23.44	.20	.29	.11	6.97	9.27	3.70	
January	22	24.97	27.06	21.46	.70	2.74	.17	5.90	7.85	4.67	
February	25	26.53	26.91	22.95	.26	.45	.11	7.17	9.70	5.35	
March	18	25.07	26.08	24.08	.33	.85	.17	7.09	7.83	4.85	
April	27	24.98	26.35	24.13	.29	.85	.17	7.77	9.08	7.05	
May	25	24.80	28.41	21.92	.35	.56	.23	8.26	12.31	6.77	
June	26	25.67	28.13	23.77	1.23	2.09	.45	8.33	10.16	7.60	
Total.	296	305.43	-----	-----	6.16	-----	-----	79.58	-----	-----	7

AVERAGE FOR THE YEAR.

Illuminating power in sperm candles:	
Mean of observations	25.45
Highest	28.80
Lowest	21.46
Quantity of ammonia in 100 cubic feet:	
Mean number of grains .....	.61
Highest number of grain	2.74
Lowest number of grains .....	.11
Quantity of sulphur in 100 cubic feet:	
Mean number of grains	6.63
Highest number of grains	12.31
Lowest number of grains	2.74
Sulphureted hydrogen, number of times present during the year	7

Each observation consists of ten readings on the Bunsen photometer at intervals of one minute.

182 OPERATIONS OF THE ENGINEER DEPARTMENT, D. C.

On three occasions during the year the average illuminating power of the gas supplied by the Washington Gaslight Company was reported as less than 25 candles, namely, January 4, 1898, 24.97; January 20, 24.72; April 27, 23.37. On April 28 the illuminating power was 24.99 candles. As this was only one point less than the required standard, notice of default was not served on the company. On seven occasions the presence of sulphureted hydrogen was found at this laboratory during month of July, 1897.

Report of the illuminating power and purity of the gas supplied by the Washington Gaslight Company from June 21, 1897, to June 23, 1898.

NORTHWEST LABORATORY.

Month.	Number of observations.	Illuminating power in sperm candles.			Number of occasions that sulphureted hydrogen was present during the year.
		Mean.	Highest.	Lowest.	
July.....	25	25.72	27.17	23.90	.....
August.....	26	28.22	28.68	24.82	2
September.....	26	25.26	27.98	22.66	.....
October.....	25	25.45	29.27	23.80	1
November.....	26	25.68	27.93	22.63	22
December.....	24	25.72	28.62	24.01	14
January.....	22	25.58	27.96	22.38	8
February.....	25	26.40	28.20	23.28	.....
March.....	18	26.02	27.89	24.39	.....
April.....	27	25.56	27.18	23.42	.....
May.....	25	25.81	28.42	23.86	.....
June.....	26	26.21	27.78	24.93	.....
Total.....	295	309.63	.....	.....	47

AVERAGE FOR THE YEAR.

Illuminating power in sperm candles:	
Mean of observations <i>a</i>	25.80
Highest.....	29.27
Lowest.....	22.38
Sulphureted hydrogen, number of times present during the year.....	47

On three occasions during the year the average illuminating power of the gas supplied by the Washington Gaslight Company was reported as less than 25 candles, namely, January 4, 1898, 24.97; January 20, 24.72; April 27, 23.37. On April 28 the illuminating power was 24.99 candles. As this was only one point less than the required standard, notice of default was not served on the company. On forty-seven occasions the presence of sulphureted hydrogen was found during the year at this laboratory.

a Each observation consists of ten readings on the Bunsen photometer at intervals of one minute.

Report of the illuminating power and purity of the gas supplied by the Washington Gas-light Company from June 24, 1897, to June 23, 1898.

SOUTHEAST LABORATORY.

Month.	Number of observations.	Illuminating power in sperm candles.			Quantity of ammonia in 100 cubic feet.			Quantity of sulphur in 100 cubic feet.			Number of occasions that sulphureted hydrogen was present during the year.
		Mean.	Highest.	Lowest.	Mean number of grains.	Highest number of grains.	Lowest number of grains.	Mean number of grains.	Highest number of grains.	Lowest number of grains.	
July	25	25.21	27.28	23.55	0.54	0.85	0.17	3.57	5.49	1.09	1
August	26	25.78	28.70	24.72	.81	1.19	.51	4.01	5.35	1.51	.....
September	26	26.27	28.68	24.62	.72	1.19	.34	4.49	6.04	2.06	.....
October	24	26.59	29.03	24.26	.80	1.36	.34	3.04	9.20	.89	.....
November	25	26.01	28.12	24.47	1.43	2.89	.85	2.65	3.57	1.23	.....
December	24	25.52	27.27	24.05	.41	.85	.17	3.32	4.67	1.64	.....
January	22	26.33	28.91	24.94	.63	1.02	.17	3.04	4.25	1.09	.....
February	23	25.17	27.67	22.65	.46	.85	.34	6.05	7.76	2.74	.....
March	17	25.57	27.50	24.58	.69	1.50	.28	6.88	8.70	6.18	1
April	27	25.49	28.86	24.03	.58	.85	.17	7.77	11.81	6.66	.....
May	25	26.87	28.64	24.81	.94	1.53	.17	5.41	8.24	2.19	2
June	25	26.21	28.81	23.94	1.28	2.21	.51	6.52	8.81	3.98	.....
Total.	289	311.02	.....	.....	9.79	.....	.....	56.75	.....	.....	4

AVERAGE FOR THE YEAR.

Illuminating power in sperm candles:	
Mean of observations ^a	25.91
Highest	29.03
Lowest	22.65
Quantity of ammonia in 100 cubic feet:	
Mean number of grains .....	.81
Highest number of grains	2.89
Lowest number of grains .....	.17
Quantity of sulphur in 100 cubic feet:	
Mean number of grains	4.72
Highest number of grains	11.81
Lowest number of grains .....	.89
Sulphureted hydrogen, number of times present during the year	4

On three occasions during the year the average illuminating power of the gas supplied by the Washington Gaslight Company was reported as less than 25 candles, namely, January 4, 1898, 24.97; January 20, 24.72; April 27, 23.37. On April 28 the illuminating power was 24.99 candles. As this was only one point less than the required standard, notice of default was not served on the company. On four occasions the presence of sulphureted hydrogen was found in this laboratory during the year.

^a Each observation consists of ten readings on the Bunsen photometer at intervals of one minute.

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Report of the illuminating power and purity of the gas supplied by the Georgetown Gas Light Company from June 24, 1897, to June 23, 1898.

THIRTY-SECOND STREET LABORATORY.

Month.	Number of observations.	Illuminating power in sperm candles.			Quantity of ammonia in 100 cubic feet.			Quantity of sulphur in 100 cubic feet.			Number of occasions that sulphureted hydrogen was present during the year.
		Mean.	Highest.	Lowest.	Mean number of grains.	Highest number of grains.	Lowest number of grains.	Mean number of grains.	Highest number of grains.	Lowest number of grains.	
July	25	27.73	30.26	25.10	7.78	15.58	4.53	10.96	12.96	8.15	.....
August	26	28.67	32.45	25.44	4.07	6.23	2.77	10.41	11.56	9.38	.....
September	26	27.77	29.97	25.02	3.93	4.86	2.83	10.51	13.23	9.20	.....
October	25	27.16	31.09	23.65	2.70	3.03	2.26	10.44	11.64	9.48	.....
November	26	27.72	30.26	25.27	2.83	3.58	2.26	10.46	12.09	9.02	.....
December	24	27.02	30.39	24.64	1.51	2.16	1.24	12.80	14.87	11.12	5
January	22	27.06	32.38	24.71	1.60	1.91	1.26	14.29	15.17	13.19	.....
February	25	28.34	31.05	24.97	1.99	2.94	1.45	12.07	13.19	10.54	.....
March	17	28.01	30.76	26.01	3.46	4.76	2.21	12.87	13.37	11.15	.....
April	27	28.03	31.30	25.33	3.75	5.20	2.84	14.56	16.39	12.62	.....
May	25	27.68	31.54	25.24	3.05	4.30	2.49	13.75	15.64	11.44	.....
June	26	28.21	32.95	25.40	3.00	3.85	2.15	13.69	15.89	11.81	.....
Total	294	.....	.....	.....	.....	.....	.....	.....	.....	.....	5

AVERAGE FOR THE YEAR.

Illuminating power in sperm candles:	
Mean of observation a	27.78
Highest	32.95
Lowest	23.65
Quantity of ammonia in 100 cubic feet:	
Mean number of grains	3.30
Highest number of grains	15.58
Lowest number of grains	1.24
Quantity of sulphur in 100 cubic feet:	
Mean number of grains	12.23
Highest number of grains	16.39
Lowest number of grains	8.15
Sulphureted hydrogen, number of times present during year	5

On seven occasions the illuminating power of the gas supplied by the Georgetown Gas Light Company was found to be less than 25 candles, namely, September 25, 1897, 24.04; October 1, 24.16; October 23, 23.65; December 14, 24.64; December 29, 24.71; January 21, 1898, 24.90, and February 2, 24.97. On eighteen occasions the quantity of ammonia found exceeded the 5 grains allowed. On five occasions the presence of sulphureted hydrogen was found at this laboratory during the month of December, 1897.

Report showing the pressure of the gas supplied by the Washington Gas Light Company, as registered in the central laboratory, Tenth and D streets NW., from July 1, 1897, to June 30, 1898.

Month.	Mean.	Maximum.	Minimum.
	<i>Inches.</i>	<i>Inches.</i>	<i>Inches.</i>
July	1.54	1.92	1.20
August	1.56	1.95	1.22
September	1.50	2.24	1.23
October	1.47	1.79	1.16
November	1.55	2.02	1.21
December	1.58	1.96	1.19
January	1.70	2.12	1.31
February	1.68	2.13	1.21
March	1.61	2.16	1.20
April	1.55	2.02	1.23
May	1.50	1.99	1.12
June	1.50	1.94	.....
Average	1.56	2.02	1.20

a Each observation consists of ten readings on the Bunsen photometer, at intervals of one minute.

OPERATIONS OF THE ENGINEER DEPARTMENT, D. C. 185

Report showing the pressure of the gas supplied by the Washington Gas Light Company, as registered in the southeast laboratory, Fifth and D streets SE., from July 1, 1897, to June 30, 1898.

Month.	Mean.	Maximum.	Minimum.
	<i>Inches.</i>	<i>Inches.</i>	<i>Inches.</i>
July	1.89	2.19	1.64
August	1.86	2.26	1.64
September	1.85	2.60	1.64
October	1.94	2.59	1.52
November	2.14	2.68	1.64
December	2.17	2.79	1.68
January	2.17	2.81	1.59
February	2.15	2.81	1.63
March	2.16	2.68	1.54
April	2.19	2.82	1.59
May	2.09	2.75	1.29
June	2.01	2.79	1.59
Average	2.06	2.66	1.58

Report showing the pressure of the gas supplied by the Washington Gas Light Company, as registered in the northwest laboratory, 1335 Fourteenth street NW., from July 1, 1897, to June 30, 1898.

Month.	Mean.	Maximum.	Minimum.
	<i>Inches.</i>	<i>Inches.</i>	<i>Inches.</i>
July	1.79	2.26	1.89
August	1.82	2.18	1.48
September	1.79	2.52	1.48
October	1.69	2.03	1.85
November	1.83	2.53	1.43
December	1.84	2.37	1.48
January	1.82	2.37	1.40
February	1.77	2.18	1.85
March	1.70	2.28	1.29
April	1.74	2.20	1.43
May	1.71	2.23	1.40
June	1.76	2.20	1.38
Average	1.77	2.27	1.40

Report showing the pressure of the gas supplied by the Georgetown Gas Light Company, as registered at 1338 Thirty-second street, Georgetown, from July 1, 1897, to June 30, 1898.

Month.	Mean.	Maximum.	Minimum.
	<i>Inches.</i>	<i>Inches.</i>	<i>Inches.</i>
July	2.45	8.85	1.81
August	2.10	8.87	1.53
September	2.12	8.25	1.62
October	1.63	2.50	1.43
November	1.65	2.60	1.29
December	1.68	2.53	1.20
January	1.97	8.19	1.82
February	1.97	8.19	1.29
March	1.96	8.59	1.88
April	1.94	2.91	1.82
May	1.93	2.85	1.22
June	2.17	4.02	1.18
Average	2.01	8.14	1.83

186 OPERATIONS OF THE ENGINEER DEPARTMENT, D. C.

Report of meters inspected and proved for the Georgetown Gaslight Company and for consumers of gas in Georgetown, from June 24, 1897, to June 23, 1898.

Month.	Meters tested.	New meters for company.		Repaired meters for company.		Consumers' meters on complaint of consumers.					Consumers' meters on complaint of company.						
		Total.	Correct.	Total.	Correct.	Total.	Fast.		Slow.	Correct.	Total.	Fast.		Slow.	Correct.		
							No.	P. ct.				No.	P. ct.			No.	P. ct.
July.....	2					2	No.	P. ct.	No.	P. ct.	2						
August.....	14			9	9	1	1	4.83			4	2	5.08	1	6.50	1	
September.....	19	18	18			1					1						
October.....	17	12	12			4	1	5.00	1	7.33	2	1				1	
November.....	26	24	24			2					2						
December.....	12			10	10	2	2	5.11									
January.....	7			1	1	6	2	3.99			4						
February.....	32	24	24			8	4	4.45			4						
March.....	10					7					7	3	2	4.83		1	
April.....																	
May.....	3					3	2	6.83			1						
June.....	1	1	1														
Total.....	143	79	79	20	20	36	12	5.03	1	7.33	23	8	4	4.95	1	6.50	3

One hundred and forty-three meters were inspected and proved by this office for the Georgetown Gaslight Company and for consumers of gas in Georgetown during the year ending June 23, 1898. Of this number 16 registered fast—average error 4.99 per cent; two registered slow—average error 6.91 per cent; 125 registered within the limits allowed by law, namely, 2 per cent either way.

Report of meters inspected and proved for the Washington Gaslight Company and for consumers of gas in Washington from June 24, 1897, to June 23, 1898.

Month.	Meters tested.	New meters for company.						Repaired meters for company.						
		Total.	Fast.		Slow.		Cor-rect.	Total.	Fast.		Slow.		Cor-rect.	
			No.	P. ct.	No.	P. ct.			No.	P. ct.				
July.....	197							138						138
August.....	200							119	1	4.33				118
September.....	204							141						141
October.....	245	75				75	100							100
November.....	425	218				218	147							147
December.....	332	90	1	5.00		89	114							114
January.....	356	78				78	134							134
February.....	316	4				4	165							165
March.....	291	96				96	124							124
April.....	202	1				1	128							128
May.....	148						108							108
June.....	179	25			1	16.66	24	108						108
Total.....	3,095	587	1	5.00	1	16.66	585	1,526	1	4.33				1,525

Month.	Consumers' meters on complaint of consumers.					Consumers' meters on complaint of company.					Consumers' meters on complaint of company that did not register.		
	To-tal.	Fast.		Slow.		Cor-rect.	To-tal.	Fast.		Slow.		Cor-rect.	
		No.	P. ct.	No.	P. ct.			No.	P. ct.	No.			P. ct.
July.....	18	7	4.01	1	9.00	10	41	.....	34	27.10	1	6
August.....	14	3	3.55	.....	.....	11	67	.....	57	33.34	1	9
September.....	17	9	4.33	2	8.83	6	46	1	3.66	37	23.08	1	7
October.....	25	8	5.68	1	3.33	16	45	.....	42	18.30	1	2
November.....	26	9	4.44	2	12.66	15	34	.....	26	30.81	1	7
December.....	51	17	5.13	6	11.55	28	77	.....	45	51.51	2	80
January.....	47	21	5.01	3	5.05	23	97	.....	77	42.66	2	18
February.....	86	45	5.05	6	7.86	35	61	5	5.03	44	23.37	1	11
March.....	21	7	4.75	1	18.33	13	50	4	4.08	28	30.14	4	14
April.....	29	12	4.94	5	4.83	12	44	.....	38	33.06	.....	6
May.....	12	3	5.66	2	3.83	7	28	.....	21	29.64	1	6
June.....	22	3	4.38	5	4.89	14	24	.....	20	23.15	.....	4
Total.....	368	144	4.74	34	8.19	190	614	10	4.25	469	29.26	15	120

a Average.

Three thousand and ninety-five meters were inspected and proved by this office for the Washington Gaslight Company and consumers of gas in Washington during the year ending June 23, 1898. Of this number 156 registered fast—average error 4.58 per cent; 504 registered slow—average error 18.03 per cent; 2,315 registered within the limits allowed by law, namely, 2 per cent either way; 120 did not register the gas flowing through them.

Three meters were inspected for the Alexandria Gas Works.

REPORT OF THE INSPECTOR OF BUILDINGS.

WASHINGTON, D. C., August 8, 1898.

SIR: I have the honor to submit herewith the annual report covering the transactions of the building department for the fiscal year ending June 30, 1898, together with recommendations for the fiscal year ending June 30, 1900.

Statement of permits issued from June 30, 1897, to July 1, 1898.

Description.	Number.	Value.
Brick dwellings.....	578	\$2,020,800.00
Frame dwellings.....	126	180,150.00
Brick repairs.....	646	746,071.00
Frame repairs.....	504	75,748.00
Stores (brick).....	25	111,775.00
Stores (frame).....	1	150.00
Stables (brick).....	46	53,890.00
Stables (frame).....	8	1,415.00
Warehouses.....	6	22,900.00
Churches.....	3	179,000.00
Office buildings.....	10	88,300.00
Workshops, etc.....	9	11,100.00
Flats and apartment houses.....	27	339,200.00
Greenhouses, etc.....	10	3,510.00
Grand stand.....	1	2,500.00
Power house.....	2	146,200.00
Hospital.....	1	20,000.00
Ice house.....	1	4,000.00
Museum.....	1	24,000.00
Gas holder.....	1	70,000.00
Wood and coal yard.....	1	750.00
Sheds.....	214	11,495.00
Boilers and engines.....	42	40,505.00
Minor repairs.....	2,258	4,153,459.00
Awnings.....	1,818	14,544.00
Elevators and fire escapes.....	142	12,750.00
Vaults.....	9	22,100.00
Total.....	4,227	4,203,620.57

Special applications for projections beyond the building line approved..... 509

Comparative statement of building operations for the years 1897 and 1898.

Year.	New buildings.	Repairs.	Dwellings.
1897.....	1,098	921	732
1898.....	1,117	1,150	699
Increase.....	19	229	63

a Decrease.

Valuation of building operations:

1897.....	\$4,102,598.75
1898.....	4,203,620.57
Increase.....	101,021.82

Number of permits issued:

1897.....	1,622
1898.....	1,869
Increase.....	247

188 OPERATIONS OF THE ENGINEER DEPARTMENT, D. C.

The following summary will show the distribution of improvements in the different sections of the District and the value of same:

Northwest buildings	\$1, 319, 925	Northwest repairs	\$629, 462
County buildings	1, 256, 620	Southwest repairs	52, 055
Northeast buildings	364, 620	County repairs	48, 377
Southeast buildings	269, 020	Northeast repairs	47, 833
Southwest buildings	121, 455	Southeast repairs	44, 092
Total	3, 331, 640	Total	821, 819

The following were the receipts of the office for the year:

For building permits	\$3, 127. 00
For vaults or underground construction	767. 57
For awnings	142. 00
For boilers, engines, ovens, etc	52. 00
Total	4, 088. 57
Received for year 1897	5, 580. 77
Received for year 1898	4, 088. 57
Decrease	1, 492. 20

In addition to the permits above enumerated, miscellaneous permits were issued, for which no fees were obtained, consisting of rebuilding entrance porches and steps, temporary structures for the use of builders in connection with new construction, extra occupancy of public space for building materials, and excavations for buildings.

The corps of assistant inspectors have been faithful and painstaking in the discharge of the duties assigned them, and I append a statement of the execution of the miscellaneous character of their assignments.

SIR: I have the honor to submit the following as a list of inspections made by me during the fiscal year ending June 30, 1898:

Elevators	967
Elevators inspected and condemned for repairs	66
Premises examined to locate steam boiler and engine	69
Premises examined to locate bake ovens	17
Premises examined to locate gas engines	19
Premises examined to locate gasoline engines	4
Inspections for the United States	7
Miscellaneous inspections	220
Premises examined to locate fire escapes	68
Fire escapes examined and condemned during construction	3
Premises examined to locate electric motor	3
Total	2, 317

I have the honor to submit herewith the following amendment to the fire-escape law:

After the word asylum, in line 9, section 1, strike out the words "owning or using any building 50 feet high or upward," and insert "office building, mercantile building, or any building at the discretion of the inspector of buildings and chief engineer of the fire department." The section to read as follows:

That it shall be the duty of the owner or owners in fee or for life of every building constructed or used or intended to be used as a hotel, factory, manufactory, theater, tenement house, apartment house, seminary, college, academy, hospital, asylum, hall, place of amusement, office building, mercantile building, or any building at the discretion of the inspector of buildings and chief engineer fire department, and the trustee or trustees of every estate, association, society, college, academy, school, hospital, asylum, owning or using any building for any of the purposes herein above mentioned, to provide and cause to be erected and affixed to said buildings iron fire escapes and combined standpipes and ladders, or either of said appliances, as may be approved and adopted by the Commissioners of the District of Columbia.

Thanking you for your past kindness and uniform support on all occasions, I have the honor to remain,

Very respectfully,

E. F. VERMILLION,
Assistant Inspector of Buildings.

SIR: We, the undersigned assistant inspectors, respectfully submit the following statement of the amount and character of the work done in connection with the building operations of the District of Columbia during the fiscal year ending June 30, 1898:

Inspections of new buildings in city and county.....	6,238
Inspections of old frame buildings and sheds examined for repair.....	1,172
Inspections of old buildings reported as dangerous.....	27
Inspections of old brick buildings examined for repair.....	1,689
Inspections and notices sent to make good defective construction.....	105
Inspections and notices sent for condemnation of party walls.....	18
Inspections and notices sent for condemnation of brick buildings.....	22
Inspections and notices sent for condemnation of frame buildings.....	59
Inspections and notices sent for condemnation of defective chimneys.....	14
Notices sent for removal of obstructions from streets, alleys, parkings, etc....	33
Notices sent to vacate dangerous buildings.....	9
Notices sent correcting numbers on old buildings.....	253
Orders and notices sent correcting violations of building regulations.....	66
Orders and notices to make repairs to defective downspouts and gutters.....	83
Orders to remove horses, etc., from frame sheds converted to stables.....	31
Miscellaneous inspections not enumerated above.....	501
Total.....	10,320

Attention is called to the above detailed statement of the character and large amount of work performed by your assistants, it being greatly in excess of any preceding year in the history of this office.

The increased efficiency is due to the fact that the inspectors have been equipped with bicycles, which enabled them to cover a greater amount of territory than could be covered on foot, and the better organization of the staff, which brought better results and made them more efficient in the discharge of their duties.

Attention is particularly called to the large number of visits made other than those that apply to the direct inspection of new work and repairs to old buildings, and shows the varied character of work the assistant building inspectors are called upon to perform, and which entails upon them a large amount of clerical duty.

In our opinion the force of the office should be increased, to enable the department to give the field work the attention it should receive and which the public demand.

We are very often required to work early and late in order that the conditions will be fully complied with.

Thanking you very kindly for your uniform kindness and support which we have on all occasions received from you, we have the honor to remain,

Very respectfully,

R. M. EVANS,
C. W. SOMMERVILLE,
R. E. CRUMP,

Assistant Inspectors of Buildings.

Your attention is invited to the tabulated statement of the building operations of the year, which present, for the first time since 1893, the gratifying feature of an increase, both in the number of buildings and valuation. The number of buildings is 19 greater than last year, and the valuation \$101,021.82. The number of dwellings erected is 33 less than the previous year, but there were 21 more apartment houses constructed than during the last fiscal year.

The statements of the assistants show that more frequent inspections of buildings were rendered last year, owing to the fact that bicycles were provided, which enabled them to cover more territory than formerly. As the volume of business that this office is called upon to perform increases each year, I renew my request that the force of assistant inspectors be increased, and recommend that provision be made for three more men.

It is generally admitted that the physical equipment of the building department has never been sufficient to give that prompt attention to the dispatch of the great amount of work this office is called upon to execute.

I also renew my recommendation of last year that an additional clerk, at \$1,200 per annum, be provided for. This employee is an absolute necessity for the proper administration of this office, as the great amount of work rendered by the clerk temporarily employed during the year to assist me has been of great service and should be made permanent.

I again recommend that the salaries of the assistant inspectors be made \$1,200 per annum, as I am satisfied that the compensation now given is inadequate for the services rendered; and for the same reason the salary of the principal assistant inspector should be made at least \$1,800.

DISTRICT BUILDINGS.

The plans and specifications were prepared under the supervision of the inspector of buildings for the several municipal buildings provided for in the appropriation bill, and in the erection of which the expenditures made are shown by the following detailed accounts:

ANTHONY BOWEN SCHOOL.

Appropriation	\$30,000.00
Site (additional ground).....	\$2,616.25
Contract No. 2381.....	21,927.00
Contract, heating and ventilating, No. 2382.....	2,400.00
Draftsman.....	256.00
Tracer.....	9.00
Condemnation of lot.....	60.00
Specifications.....	24.54
Superintendence.....	644.00
Drawing material.....	2.67
Blackboarding and material.....	50.30
Grading yard and building retaining wall.....	533.00
Cement and sacks.....	12.84
Putting up bell.....	13.50
Wire guards.....	21.35
Repairing bell.....	4.25
Iron fence.....	305.62
Painting fence.....	11.00
Extra work by contractor.....	875.00
	<hr/>
	29,766.32
Less for cement sacks returned by contractor.....	20.44
	<hr/>
	29,745.88
Balance.....	254.12

FOR LOT ADJOINING CURTIS SCHOOL.

Appropriation	\$5,000.00
Site	\$4,256.00
Removing fence, grading lot, and building wall fence.....	702.00
Picket fence on building line.....	15.00
	<hr/>
	4,973.00
Balance	27.00

WESTERN HIGH SCHOOL.

Appropriation	\$133,000.00
Site	\$30,000.00
Contract for building (No. 2380).....	84,413.00
Heating and ventilation (No. 2391).....	11,993.00
Electric wiring for telephone and clocks.....	397.00
Superintendence	1,552.00
Drafting (including plans for heating and ventilating)	1,080.00
Tracing	15.00
Specifications.....	77.83
Blue prints	66.48
Skilled labor.....	282.50
Specifications, heating and ventilating	13.83
Extra work.....	1,245.80
	<hr/>
	131,136.44
Deductions for omissions.....	\$1,025.37
Forfeiture for overtime	610.00
Superintendence for overtime charged contractor.....	232.00
Profit on cement.....	4.35
	<hr/>
	1,871.72
	<hr/>
	129,264.72
Balance	3,735.28

OPERATIONS OF THE ENGINEER DEPARTMENT, D. C. 191

SCHOOL BUILDING, CONNECTICUT AVENUE EXTENDED.

Appropriation		\$16,000.00
Site	\$6,000.00	
Contract for building (No. 2450)	8,247.00	
Drafting	68.00	
Specifications	13.58	
Drawing materials	9.86	
Superintendence	383.00	
Well and pump	232.79	
Blackboards	14.75	
Skilled labor	12.50	
Extra work	856.00	
		<u>15,837.48</u>
Balance		162.52

CONGRESS HEIGHTS SCHOOL.

Appropriation		\$12,219.76
Contract for building (No. 2359)	\$9,780.00	
Heating (No. 2389)	1,800.00	
Superintendence	256.00	
Skilled labor	17.50	
Blackboarding	42.55	
Blue prints .....	.90	
Extra work	71.00	
		<u>11,967.95</u>
Deduction for old tin roof	\$291.24	
Work omitted	51.67	
Superintendence for overtime	60.00	
		<u>402.91</u>
		<u>11,565.04</u>
Balance		654.72

NOTE.—The above balance will be expended in painting the exterior of the building and placing clocks in tower.

HAYES SCHOOL, FIFTH AND K STREETS NE.

Appropriation		\$39,000.00
Site	\$9,999.45	
Contract (No. 2369)	24,538.00	
Heating and ventilating (No. 2370)	2,400.00	
Draftsman	180.00	
Tracer	99.00	
Drawing material, etc.	19.69	
Specifications	21.52	
Superintendence	923.00	
Railing and areas	24.00	
Blackboarding and material	43.75	
Wirework	144.00	
Forfeits waived by Commissioners	740.00	
Extra work	893.25	
		<u>40,025.68</u>
Forfeits	\$740.00	
Omission to plane off floors	50.00	
Omission of grounds for plastering	30.00	
Profit on cement	3.60	
Superintendence for overtime allowance	223.00	
		<u>1,046.60</u>
		<u>38,979.06</u>
Balance		20.94

FOR COMPLETION OF WALLACH SCHOOL.

Appropriation		\$2,000.00
Labor and material for painting, plastering, and carpenter work, etc.		1,926.05
Balance		<u>73.95</u>

192 OPERATIONS OF THE ENGINEER DEPARTMENT, D. C.

LOVEJOY SCHOOL—MODERN HEATING AND VENTILATING APPARATUS.

Appropriation	\$5,725.24
Draftsman	16.00
Balance	5,709.24

INDUSTRIAL HOME SCHOOL—MAINTENANCE, INCLUDING REPAIRS.

Appropriation	\$11,000.00
Paving	\$20.00
Addition to stack	54.00
	74.00
Balance	10,926.00

NOTE.—Balance of appropriation expended under direction of board of managers of the Industrial Home School.

TWO ISOLATION HOSPITALS.

Appropriation	\$30,000.00
Specifications, partially printed	3.55
Balance	29,996.45

NOTE.—The plans were prepared for one of these buildings and specifications partially printed when work was suspended by injunction or restraining order of the court.

WASHINGTON ASYLUM—CENTRAL HEATING STATION, HOSPITAL DEPARTMENT.

Appropriation	\$8,500.00
Contract (No. 2406), steam heating plant	\$7,400.00
Draftsman	94.00
Tracer	6.00
Specifications	27.08
Superintendence	370.00
Coal vault	171.88
	8,068.44
Less superintendence for overtime	32.00
	8,036.44
Balance	463.56

SPECIAL REPAIRS TO MARKET HOUSES, 1897, 1898.

Appropriation	\$1,500.00
Western	\$898.69
Eastern	384.00
Georgetown	54.15
	1,336.84
Balance	163.16

REPAIRS TO MARKET HOUSES, CONTINGENT EXPENSES.

Appropriation	\$600.00
Cleaning water-supply pipe	\$9.00
Cement	46.50
	55.50
Balance	544.50

REPAIRS TO POLICE-COURT BUILDING.

Appropriation	\$700.00
Reconstructing and repairing steam-heating apparatus	\$253.75
Painting	207.00
Carpenter, hardware, etc	85.65
Plumbing and gas fitting	77.65
New speaking tube	5.50
	609.55
Balance	90.45

OPERATIONS OF THE ENGINEER DEPARTMENT, D. C. 193

ADDITION TO CELLS AND OTHER IMPROVEMENTS AT POLICE-COURT BUILDING.

Appropriation	\$1,200.00
Draftsman	\$26.00
Specifications	10.25
	<u>36.25</u>
Balance	1,163.75

FOUR ADDITIONAL CELLS AT FOURTH PRECINCT STATION HOUSE.

Appropriation	\$996.00
Draftsman	10.00
Balance	<u>986.00</u>

REPAIRS TO STATION HOUSES, 1897, 1898.

Appropriation	\$2,000.00
No. 1	\$513.00
No. 2	83.48
No. 3	49.30
No. 4	323.45
No. 5	51.60
No. 6	385.09
No. 7	42.30
No. 8	370.13
No. 9	66.60
	<u>1,884.95</u>
Balance	115.05

ENGINE HOUSE NO. 14, EIGHTH STREET BETWEEN D AND E STREETS NW.

Appropriation	\$35,000.00
Amount transferred from No. 12 engine house	3,797.59
	<u>38,797.59</u>

Site	\$23,475.00
Contract (No. 2526)	10,740.00
Specifications	16.85
One-half thickness of wall	295.69
Superintendence	537.00
Skilled labor	75.00
Sewer pipe	45.06
Architect	300.00
Concreting floors in engine room, cellar, and areas	191.20
Cement for engine room, cellar, and areas	186.00
Cement furnished contractor for building	87.42
Driveway	205.93
Curtain ring and shower	20.00
Cement floor in storeroom	15.44
Mechanical and electrical appliances	361.00
Constructing partition for storeroom, shelving, etc.	26.08
Lumber for partition for storeroom, shelving, etc.	11.79
Hardware	2.13
Wire screens	17.36
Bath tub	43.50
Putting up shower	5.80
Extra work	537.59
	<u>37,195.84</u>
Less cement charged contractor	\$139.50
Less sewer pipe charged contractor	45.06
Less for change of flooring	20.00
	<u>204.56</u>

Balance..... 1,806.31

NOTE.—Of the above balance the sum of \$1,000 was allowed for furniture.

ENGINE HOUSE NO. 15, ANACOSTIA.

Appropriation	\$16,200.00
Amount transferred from Brightwood engine house	1,343.41
	<hr/> 17,543.41
Site	\$2,500.00
Contract (No. 2510)	11,300.00
Draftsman	262.00
Drawing material	8.24
Specifications	27.35
Sliding pole	43.70
Superintendence	400.00
Extra work	18.65
Electrical appliances	404.50
Paving driveway	125.39
Cement floor	175.67
Material for cement floor	93.75
Cement furnished contractor	92.36
	<hr/> 15,451.61
Less cement charged contractor	146.63
	<hr/> 15,304.98
Balance	<hr/> 2,238.43
Chargeable against this balance will be material for driveway	255.65
Laying drain around building	119.00
Furniture for building	800.00
	<hr/>
Total	1,174.65

Leaving the sum of \$1,063.78 to be expended for inclosing and paving grounds and additional work to building.

REPAIRS TO ENGINE HOUSES, 1897-98.

Appropriation	\$3,500.00
No. 1	\$966.58
No. 2	66.25
No. 4	209.97
No. 5	42.75
No. 6	276.35
No. 7	457.83
No. 8	141.91
No. 9	74.80
No. 10	74.08
No. 11	64.17
No. 12	20.69
No. 13	34.49
No. 15	2.77
Chemical No. 1	5.24
Chemical No. 2	9.00
Truck A	249.28
Truck B	94.53
Truck C	101.59
Truck D	111.95
	<hr/> 3,004.23
Balance	<hr/> 495.77

On May 11, 1898, the Commissioners transferred the supervision of station-house, engine-house, and market-house repairs to Mr. L. E. Bond, superintendent of school repairs.

To relieve this office of the labor of preparing plans for the municipal buildings, advantageous terms were made with four leading architects of this city by the Commissioners, and drawings and specifications were obtained for three schoolhouses and one engine house. The latter is completed and occupied, and it is expected that the schoolhouses will be ready for occupancy in September next. The architectural treatment of the buildings is very satisfactory, and this method of disposing of the architectural work under the supervision of this office will be continued.

In October last the new building regulations went into effect, and their application results in a better and more substantial method of construction than prevailed under the old regulations.

To exercise that supervision over general construction necessary to insure compliance with the regulations the number of assistant inspectors should be increased. The necessity is and has been urgent, and will become more and more so. Therefore I hope that the recommendations made will be approved, and the increased assistance not denied. Manifestly the building inspector has but little opportunity to give his personal attention to this branch of the work. Office work and the supervision of municipal buildings engrosses his whole time, and entire reliance for the proper inspection of general construction must be placed in his assistants.

I reiterate the arguments heretofore used in my former reports, and ask that you present to the law-making power the claims and requirements of this department for that assistance necessary for the proper supervision of general construction.

In conclusion, I beg to extend to you the acknowledgments of my obligations for the uniform kindness and courtesy which you have always manifested toward me.

Very respectfully,

JNO. B. BRADY,
Inspector of Buildings.

Capt. LANSING H. BEACH,
*Corps of Engineers, U. S. A.,
Engineer Commissioner, District of Columbia.*

REPORT OF THE SURVEYOR.

WASHINGTON, July 20, 1898.

SIR: I have the honor to transmit herewith a statement of the transactions of this office during the year ending June 30, 1898.

During that period 576 lots were surveyed for private parties and 576 certificates of surveys issued, which, together with the recording of the same, make a total of 1,142 plats issued and recorded. In all cases of surveys of lots full or partial plats of the square have to be made, showing the original lots and subdivisional parts into which the lots in the square have been divided. This is very essential to the intelligent and correct making of the survey required. Although new plats are not required in each instance, still it would be fair to estimate the number of new plats made at 200, making an aggregate of 1,342 plats.

One hundred and twenty subdivisions were received and recorded, which, together with the preliminary plats in duplicate and the recording, aggregate 360 plats.

Plat of division of the estate of Thomas Brown, deceased, was placed in Book CO 10, by order of the Commissioners, "for reference only."

Plat of outline survey of Mary L. Beall's tract was recorded, by order of the Commissioners.

Surveys of tracts for private parties were made of the following properties, viz: Part of Glenwood Cemetery; Malvina Fletcher's, near Brightwood; part of a tract called "Indolence;" Prospect Hill Cemetery; Baltimore and Potomac Railroad tracts lying south of square 1130; and part of tract called "Cliffbourne."

The following services were performed for the District, per order of the Commissioners:

Surveys.—B street, between the dump and Twenty-third street NW.; alley, square 78, rear of 2019 I street NW.; part of lots 5 and 6, square 431; alley, block 7, Washington Heights; north line of Harrison street, Anacostia, from east line of Fredericks subdivision to Minnesota avenue; Division street, "Lincoln;" land lying west of Twenty-eighth street W., and between I and K streets NW.; Kramer street, between Sixteenth and Seventeenth streets NE.; Rosedale street, between Fifteenth and Sixteenth streets NE.; Gale street, between Fifteenth and Sixteenth streets NE.; alley, square 245; alley, square 719, encroachments rear of 111 H street NE.; alley, square 752; line in rear of stable corner of Chappell road and Connecticut avenue; alley, square 630; alley, square 467, rear of 644 F street SW; lots 21 to 27, square 8, West Eckington; lots 17 to 22, and parts of lots 16 to 23, and parts of alleys, square 830; lots 35 to 40, and part of lot 8, square 44; alley, square 882; alley, square 491, showing encroachments thereon; Pierce street, between Fourteenth and Fifteenth streets NW.; Poplar street, between Twenty-seventh and Twenty-eighth streets NW.; Mill street, between Poplar and Pierce streets NW.; Reservation 201, to locate encroachments thereon; alleys, square 617; to locate nuisance on block 8, Bloomingdale; points at and near Ebbitt House, for United States Attorney, District of Columbia, for use in trial of United States v. Cauty; Twentieth street, between Kalorama avenue and Woodley road; Baltimore street, from Columbia road to Twentieth street NW.; Twentieth street, from Baltimore to Cincinnati streets.

Plats furnished.—Square 825; Kalorama Heights, blocks 26 and 27; alley, square 374, rear of lots 35 to 38; square 78; square 881; block 3, S. P. Brown subdivision of Mount Pleasant; dedication of part of lot 13, square 691, for alley purposes; square 69, two plats, alleys, etc.; girl's portion, Green's property; Holmead Manor, block 43, three plats; Prospect Hill Cemetery, sketch plat; square 158, showing existing alleys; square 620, three plats of proposed alleys; square 122, two plats, proposed subdivision of lot 2; square 916, two plats, proposed change in alley.

Plats recorded.—Dedication of part of "Cliffbourne," for widening Columbia road; dedication of part of Ingleside, for widening Park street between Kenesaw avenue and Grant street NW.; establishing building line of Sixteenth street extended between Kenesaw avenue and Lowell street NW.; West street extended, through Cunningham's land; Arizona avenue, between Canal and New Cut roads; square 69, closing alley and opening Minor street, Newport place; square 412, opening and closing alley; dedication of T street south, and 18 inches east; dedication of land for widening Columbia road in front of blocks 5, 6, and 7, Washington Heights; closing alleys in blocks 137 and 138; and opening streets through blocks 134, 136, 137, and 138, Burleigh, addition to West Washington.

One hundred and eleven reports upon miscellaneous subjects.

The improvements on many of the avenues, streets, and alleys in the District rendered necessary the removal of many of the marks of surveys which were of great value, and in order to preserve their exact location for future reference their positions have been fixed by measurements, so that they can be accurately replaced when the improvements have been finished. To preserve these points required measurements to be made on 111 avenues, streets, and alleys.

The card system has been introduced into this office in a very modest way, and has been found to work very advantageously in the matter of ready and correct reference. Its use thus far has been confined to the personnel of the office, and, in order that the public may be benefited by its advantages over the old system of book indexing, I recommend it to your consideration and ask that a card-system outfit be purchased for the use of this office.

During the year a complete inventory has been made of all the maps, which are of great value, after which they have been indexed and carefully filed away. Three volumes of miscellaneous plats have been carefully examined and indexed.

At least one-third of the time of the personnel of this office is devoted to the public, in giving information respecting the original records and subdivisions of property and other information concerning property interests in the District of Columbia.

I beg to renew the recommendations made in former reports concerning the old records of this office, which are rapidly disintegrating, and which ere long will be past saving, owing to the poor character of the paper on which they are made and their continuous handling since the year 1809, the date which first appears on the records of the subdivisions. The records in some instances have become so badly defaced as to render the writing and figures unintelligible. Every possible precaution has been taken to preserve and save them from injury, but owing to the fact that they are the current books of record and the only ones available for the use of the public, and are in constant use, their condition can not be wondered at. They have been bound so often and the paper cut so close to the writing as not to allow any more to be cut therefrom without wholly obliterating official signatures and seals.

These records are of inestimable value, for the reason that they contain correct information respecting the early history of the District of Columbia, under the municipal governments of Washington and Georgetown, and also the county, which prior to the year 1871 was under the jurisdiction of the levy court and embraced all the territory in the District of Columbia lying without the boundaries of the aforementioned cities. The foundation for all the titles to property in this city is contained in said records, inasmuch as they show the relations existing between the United States and the original proprietors at the time Washington was selected as the temporary and permanent seat of government of the United States, and which, under an engineer and a commission appointed by the President, was platted, surveyed, and laid out into streets, avenues, and squares, the last of which were divided between the United States and the proprietors of the original tracts. The books of record, showing the original divisions and subdivisions of property in this city, now in the custody of the surveyor of the District of Columbia, are the only official ones extant, and their loss would be irreparable to the District of Columbia and the property owners. In order to save the records from further defacement and injury, I suggest that duplicate copies be made of the records not already copied, and the copies already made be verified by careful comparison with the originals, and their correctness certified to by the surveyor or assistant surveyor of the District of Columbia. This would give them legal status, and the originals could then be put in a place of safety and used only in cases of litigation.

To execute the work necessary for copying and comparing copies of said records would require an annual appropriation of \$2,600 until the work is completed. This sum would be required for the employment of a competent draftsman, at \$1,400 per annum, in making copies of the records, and the employment of a clerk, at \$1,200 per annum, to assist in the performance of the work generally, and the verification of the copies.

In a special report made by Mr. Henry B. Looker, the surveyor of the district, on February 2, 1898, to the Engineer Commissioner, he strenuously advocated the fireproofing of one of the office rooms used by him in the next wing of the city hall, so that the records of the surveyor's office might be placed therein at the close of the official day and thus be saved from destruction in case of fire during the absence of the surveyor and his subordinates. The floors of the offices are made of wood and rest on brick arches, but the entire construction of the rooms overhead is of wood and liable to destruction by fire at any time. The building is patrolled by a watchman both day and night, so that while a conflagration might be a remote possibility and might not occur during the occupancy of the rooms by the surveyor, I think it advisable to use every means to preserve and protect the valuable records of this office from destruction or injury by either fire or water. The surveyor gave this matter serious and thoughtful consideration and devised a plan which he submitted to the Engineer Commissioner of the character of the work and the manner in which he wished it done.

I would respectfully call attention to the amount of work required of this office since the surveyor became a salaried officer in comparison with what was done under the fee system. There has been very little increase of force under the recent arrangement, while the work has almost doubled, making it impossible to keep up with the current work and have records in the best shape. In addition to the work for private parties, calls for which are made daily, a large number of surveys are ordered by the Commissioners from time to time in the location of alleys, street lines, and school sites. The law requiring all official surveys to be made by the employees of this office has narrowed down the work formerly done by the outside parties and thrown additional work upon this force. At least one field party, consisting of an assistant surveyor and three aids, should be added, and also one or two assistants for the office work. This would aid in gathering up many loose ends that it is now impossible to attend to and would expedite all field work.

This office for the past year has been under the direction of Mr. Looker, surveyor, and the above recommendations accord with suggestions by him. My connection with this office during that time has been quite close, and I respectfully urge these pressing needs.

The assistants of this office are capable and efficient, and I desire to express appreciation for their interest and aid.

Very respectfully,

WM. P. RICHARDS,
Surveyor.

Capt. LANSING H. BEACH,
Corps of Engineers, U. S. A.,
Engineer Commissioner, District of Columbia.

REPORT OF THE SUPERINTENDENT OF PARKING.

WASHINGTON, July 29, 1898.

CAPTAIN: I have the honor to submit the following report of the work performed under the supervision of this office during the fiscal year ended June 30, 1898:

One thousand nine hundred and eighty-three trees, consisting of oriental planes, Norway, sugar, and silver maples, elms, lindens, salisburias, sweet gums, and tulip trees, have been planted on the streets and avenues of the city and District, and four-fifths of the entire planting were of the three first-named varieties.

Notwithstanding the continued prevalence of dry weather, these trees are all in excellent condition.

Nine thousand eight hundred and nineteen seedlings were planted in the District nursery, as follows: Six hundred and twenty-five chestnut oaks, 1,950 pin oaks, 104 willow oaks, 2,858 Norway maples, 2,495 sugar maples, 1,770 oriental planes, and 17 American lindens. There are at least 20,000 tree seedlings in the nursery seed beds ready for planting in nursery rows of the above varieties, and in addition several thousands of red oaks. None of these last named were planted on the streets during the year, they not being large enough for the purpose. This tree has as yet been planted only on four streets in this city, viz: Twelfth and Fourteenth streets west, between B street north and B street south; Fifteenth street SE., between

Pennsylvania avenue and B street, and on Harvard street, Mount Pleasant; here excellent specimens can be found.

The cultivation of all young trees on the streets and in the nursery has been given especial attention, and the conditions surrounding them are favorable for their future welfare.

Two and one-half tons of leather straps were purchased and used on all young trees in their boxes to prevent their coming in contact with the tops of the boxes and being girdled in the time of high winds. Because of the small amount of appropriation no wire was purchased for the purpose of protecting the larger trees from injury by horses eating them, but about 10,000 old wire guards which had become useless from many causes, being rusted out and badly broken, were removed, condemned, and carted to the dump. The work of loosening tight wires and readjusting them has been given the usual attention.

About 700 old trees which had become objectionable from various causes were removed.

The mowing of street parkings and reservations under the control of the Commissioners has been conducted as usual, but because of the dry weather during the latter part of May and the entire month of June the work has been lighter than usual.

Caterpillars appeared on the trees only in small numbers, and were promptly attacked and destroyed at small cost.

The trimming of trees in various parts of the city was given the usual attention, most of this work being done on the older trees, which yearly have considerable dead wood in them, caused probably by their being too close together, and in many cases by the resetting of curbing and laying of cement sidewalks. Brick sidewalks with sand under them absorb the moisture from rains and serve as a mulching for the retention of the same, while cement sidewalks shed it all, and the broken stone and cement base affords no place for their rooting.

When systematic tree planting in this city was begun, bluestone curb was used on the streets, and the trees were planted much closer to the curb than is now being done. Their roots therefore, in many instances, have forced the curb out of line, and when a broader curb is used and the line straightened, many roots are necessarily cut, and in a number of instances trees have been killed outright and in many others so severely injured as to render their removal obligatory. These have to be replaced, and from the fact that none of this work had been anticipated and provided for by an increase in the appropriation, in endeavoring to keep up the lines of trees already established the work of planting on new streets has been falling behind; and this can not be avoided unless appropriations are increased at least 50 per cent or the trees now on the streets are neglected.

DISTRIBUTION OF WORK.

Appropriation for the year ending June 30, 1898.....	\$20,000.00
Amount expended under other appropriations.....	668.73
Sums deposited by individuals	97.00
Total available	20,765.73
Work at office in repairing and sharpening tools, attending to repairs of tree boxes and damages to trees reported by the police department, etc.	638.75
Work at the nursery, general cultivation of stock, preparation of seed beds, sowing of seeds, care and transplanting of seedlings, digging and trimming of trees for street planting, making of tree boxes, etc	2,073.78
Digging tree holes on streets	4,965.66
Planting trees	1,471.52
Strapping trees	673.77
Cultivation of trees on streets.....	1,724.32
Cutting roots which had disturbed sidewalks, and paving around young trees.....	1,130.72
Trimming trees	2,059.73
Removing trees	1,494.30
Readjusting and removing broken tree wires	766.60
Removing caterpillars.....	223.20
Mowing and care of street parkings	583.95
Removing old tree boxes	13.70
Gathering tree seed.....	26.15
Total	17,846.15

Materials:

Lumber for tree boxes, tree straps, soil, nails, staples, and miscellaneous articles	\$2,919.58
Total expended	20,765.73
Number of trees on the streets as per last report.....	75,554
Number removed during the year.....	700
	74,854
Number planted during the year	1,983
Total number now on the streets	76,837

Four foremen were employed on days suitable for work, at \$3 per diem; total amount, \$2,695.

Very respectfully,

TRUMAN LANHAM,
Superintendent of Parking.

Capt. LANSING H. BEACH,
*Corps of Engineers, U. S. A.,
Engineer Commissioner, District of Columbia.*

(Through Mr. W. P. Richards, assistant engineer in charge.)

LETTER FROM THE PARKING COMMISSION.

WASHINGTON, July 28, 1898.

CAPTAIN: In addition to the foregoing report of the superintendent of parking, the following suggestions are respectfully submitted by the parking commission:

The money appropriated for the work of street tree planting and for the many operations connected with the proper care of the trees and parkings throughout the city is altogether inadequate. A yearly appropriation of \$40,000 is needed to maintain and extend these improvements as they should be done and fill the reasonable expectations of every one interested in having the city ornamentation developed in this the pioneer and leading city of the world in this respect.

There are many things pressing for immediate recognition. Prominent among these is that of the removal of trees at street corners where they interfere with the proper lighting of the city. The trees are too closely set at these points and prevent the proper distribution of light from the lamps. This has long been a source of annoyance, and would have been remedied if means had been at command.

Equally pressing is the removal of superfluous trees from the parkings in front of dwellings. These served a purpose for shade when the street trees were small; but now they are worse than useless, as they injure the growth of those set at the curb and overshadow the houses, so as to impede light and the circulation of air, so essential around dwelling houses.

Many thousands of trees are exposed to injury and mutilation by horses and other pernicious agents, owing to the absence of wire guards, which are at once the cheapest, neatest, and most effectual protection that has been employed for this purpose. Five thousand dollars' worth of wire could be profitably used on the trees now in need of protection.

In some parts of the city it has become necessary to remove bad trees and substitute better kinds. Especially those that injure the pavements by upheaval from surface roots should be removed. These now entail expense in repairing injured pavements, and the only effectual remedy is the removal of the trees and the planting of others less objectionable in this respect.

Another matter demanding attention is that of increasing the salaries of the superintendent and his assistant. The duties of the superintendent are of an expert character, as well as requiring a notable degree of administrative and executive ability. It would seem only a matter of justice that his remuneration should equal that of others in similar positions. It is therefore hoped that his salary will be placed at \$1,600 per annum. The salary of the assistant superintendent, who also acts as secretary, should be placed at \$1,200 per annum.

We earnestly trust that these suggestions will be duly entertained.

Respectfully,

JAS. E. JOUETT,
Rear-Admiral, United States Navy.
WILLIAM SAUNDERS,
Parking Commission.

Capt. LANSING H. BEACH,
*Corps of Engineers, U. S. A.,
Engineer Commissioner District of Columbia.*

REPORT OF THE ASSISTANT ENGINEER IN CHARGE OF STREET
EXTENSIONS.

WASHINGTON, July 30, 1898.

CAPTAIN: I have the honor to submit the following report of work in this department for the fiscal year ended June 30, 1898:

At the beginning of the year section No. 1 (the county between Rock Creek and North Capitol street extended) was the only map of record in the office of the surveyor prepared under the act for the permanent system of highways. Section No. 2 was then before the highway commission for review, section No. 3 was very near completion, and section No. 4 had been covered by a tentative plan.

Section No. 2 (the county between North Capitol street and the Eastern Branch) was first submitted to the highway commission in May, 1897, and after a public hearing the plan was returned to this office for revision. A careful study was made of the question of grade crossings, the object being to devise a plan by which the location of streets would be favored by the topography for viaducts or depressed crossings of the Baltimore and Ohio Railroad. The protests presented at the hearing were also considered, and the revised plan forwarded to the highway commission on March 15, 1898, was approved by it, and then recorded in the office of the surveyor on April 16, 1898.

Section No. 3 (the county west of Rock Creek), after receiving an exhaustive study as to grades and economical location of streets, was reviewed by Mr. Olmsted and was forwarded, with the recommendations offered by him, to the highway commission in November, 1897. On account of the topography of the section a more liberal departure from the right-line system was accepted than in sections 1 and 2. Along Connecticut avenue extended and bordering the Conduit road curved streets and large blocks are features of the plan. The section was approved by the highway commission and recorded in the office of the surveyor on May 27, 1898.

Section No. 4 (the county east of the Anacostia River) has been studied during the year in the same manner as in section 3, with even a more liberal treatment as to general plan and location of streets. Some five or six plans have been prepared on topographical maps enlarged from the Coast Survey sheets to a scale of 1 inch to 200 feet. The best features of these separate plans have been embodied in one plan, which is now ready to be reviewed by Mr. Olmsted, after which it will be completed and sent to the highway commission.

The maps that have been sent to the highway commission have been drawn on sheets 24 by 30 inches, giving details as to lots and blocks, each section covering thirty or forty sheets. These plans have all been prepared in duplicate, one copy being retained in this office.

The preparation of the plans has occasioned a thorough search of the records as to lots and property lines, and a set of maps, drawn to a scale of 100 feet to the inch, are now the property of this office, and cover almost the entire District. They are the most complete maps, as to details, yet made of the county, and it is desired to finish this set during the coming year.

Some work has also been done in fixing grades of subdivisions and of new highways in the sections now of record.

FUTURE WORK.

An amendment to the highway act, passed by Congress in June of this year, has annulled all of section 1 within subdivisions, and further directs that a revised plan shall be made for that part of the section outside of subdivisions.

The revision of section 1 and the completion of section 4 will cover some six or seven months' work. It is then intended to make a revised and complete study of street grades over all the sections, using the large scale maps of this office and the Coast Survey as a base for this work.

Very respectfully,

WM. P. RICHARDS,
Assistant Engineer Street Extension.

Capt. LANSING H. BEACH,
*Corps of Engineers, U. S. A.,
Engineer Commissioner District of Columbia.*

REPORT OF THE CHIEF CLERK.

WASHINGTON, July 12, 1898.

CAPTAIN: I have the honor to submit the following report for the fiscal year ending June 30, 1898:

	1898.	1897.
Communications received, briefed, and recorded	13, 042	9, 205
Indorsements, references, and reports thereon	65, 210	46, 025
Letters and orders prepared	6, 680	5, 972
Copies of contracts drawn	556	668
Vouchers and bills prepared, recorded, and forwarded	5, 759	8, 069

Schedules of bids received during the fiscal year for work and materials under engineer office and statements of contracts for street improvements, sewers, construction material, supplies, and miscellaneous work are herewith.

Very respectfully,

A. Y. LAKENAN,

Chief Clerk Engineer Department.

Capt. LANSING H. BEACH,

Corps of Engineers, U. S. A.,

Engineer Commissioner District of Columbia.

Statement of contracts for the improvement of streets, avenues, and roads for the fiscal year 1898.

No.	Date.	Name and address of contractor.	Location.	Character of work.
2413	1897. July 16	Cranford Paving Co., Washington, D. C.	Columbia road between Florida avenue and Eighteenth street.	Lay asphalt pavement.
2477	Aug. 10	The Washington As- phalt Block and Tile Co., Washington, D. C.	Tenth NE., East Capitol to C. Morris NE., Sixth to Seventh. Fourth SE., C to Virginia ave- nue. Ninth SE., Pennsylva- nia to South Carolina ave- nues. E, SE., Third to Fourth. D, SE., Sixth to Seventh. Fifth SE., E to G. Six-and-a- half SW., D to E. Van SW., Third to Four-and-a-half. Princeton and Roanoke NW., Thirteenth to Fourteenth streets.	Lay asphalt block pavement.
2489	Aug. 18	The Cranford Paving Co., Washington, D. C.	I, New Hampshire avenue to Twenty-sixth NW. C, Elev- enth to Twelfth NW. Twen- ty-fifth, H to K, NW. T, Seventh to Florida avenue NW. K, North Capitol to First NW. Twenty-second, F to Virginia avenue NW. F, Third to Ninth NE. Fourth, K to L, NE. E, Thirteenth to Fifteenth SE. H, Twenty- second to Twenty-third NW. North Capitol, O to Q, NW. Massachusetts avenue, Twen- ty-second to Sheridan Circle.	Lay asphalt pavement.
2491	Aug. 19	The Barber Asphalt Paving Co., New York.	Eleventh, C to D, NW. Twelfth, -C to D, NW. Eleventh, B to C, NW. Rhode Island ave- nue, New Jersey avenue to Florida avenue. First, Pierce, to New York avenue. Third, I to K, SW. Virginia ave- nue, South Capitol to Dela- ware avenue. N, Four-and-a- half to Sixth SW. M, Thirty- first to Thirty-second, George- town. M, Thirty-second to Thirty-third, Georgetown. Spruce and Bohrer, Larch to Florida avenue.	Do.

202 OPERATIONS OF THE ENGINEER DEPARTMENT, D. C.

Statement of contracts for the improvement of streets, avenues, and roads for the fiscal year 1898—Continued.

No.	Date.	Name and address of contractor.	Location.	Character of work.
2492	1897. Aug. 20	Maurice F. Talty, Washington, D. C.	Roanoke, Irving, Princeton, Harvard, and Thirteenth streets.	Grade, lay cobble gutters and flag crossings, and lay gravel or macadam roadway.
2493	Aug. 21	Gaskins & Horn, Washington, D. C.	Twelfth street, extended NE., between Florida avenue and Mount Olivet road.	Grade, remove and pile cobble, flag bricks; lay cobble gutters and flag crossings, relay cobble gutters and lay macadam roadway.
		.....do	Florida avenue NE., between M street and Brentwood road.	Grade, remove and pile cobble, flag bricks and curb, lay cobble gutter and flag crossing and relay same, set and reset curb and lay macadam roadway.
2497	Aug. 20	The Cranford Paving Co., Washington, D. C.	Sidewalks in various localities..	Lay cement pavements.
2500	Aug. 26	Charles H. Eakin, Washington, D. C.	Emporia street between Twelfth street and Brentwood road.	Grade, lay cobble gutters and flag crossings and lay gravel roadway.
2502	Sept. 8	Lyons Bros., Washington, D. C.	Sherman avenue between Whitney avenue and Grant street.	Do.
2524	Nov. 2	The Cranford Paving Co., Washington, D. C.	Intersection of Columbia road and Eighteenth street.	Lay asphalt pavement.
2525	Nov. 16	George B. Mullin, Washington, D. C.	Kenesaw avenue and Park road.	Grade.
2528	Nov. 17	James Frawley	Baltimore and Twentieth streets.	Do.
2531	Dec. 21	The Cranford Paving Co., Washington, D. C.	Tenth street NW., between D and F streets.	Lay new asphalt pavement and resurface old pavement.

Statement of contracts for the construction of sewers for the fiscal year 1898.

No.	Date.	Name and address of contractor.	Location.	To construct—
2446	1897. July 21	J. K. Murphy, Washington, D. C.	Tiber Creek and New Jersey avenue.	6,025 linear feet 14-foot by 14 foot 3 inch sewer.
			High level intercepting sewer..	6,145 linear feet 14 foot by 14 foot 3 inch sewer.
2515	Oct. 1	Andrew Gleason, Washington, D. C.	Intersection of Sixth and M streets SE.	60 linear feet 6 foot 3 inch diameter sewer.
			Sixth, between K and L streets SE.	215 linear feet 4 foot 3 inch diameter sewer.
2518	Oct. 30	B. J. Coyle, Washington, D. C.	W. North Capitol to First street; North Capitol, W to Baltimore street.	1,500 linear feet 5 foot 3 inch diameter sewer.
			North Capitol, Baltimore to Detroit streets.	950 linear feet 5-foot diameter sewer.
			Meridian, between Erie and Huron streets.	550 linear feet 2 feet 9 inches by 4 feet 1½ inches.
			Lincoln avenue, R to S streets..	560 linear feet 2 feet 3 inches by 3 feet 4½ inches.
2520	Nov. 1	E. G. Gummel, Washington, D. C.	Lincoln avenue, S to T streets..	550 linear feet 2 by 3 feet.
			L street, North Capitol to First street.	720 linear feet 2 feet 3 inches by 3 feet 9 inches.
			E SW., Four-and-a-half to Sixth street.	172 linear feet 2 feet 3 inches by 3 feet 4½ inches, and 605 linear feet 18-inch pipe sewer.

Statement of contracts for the construction of sewers for the fiscal year 1898—Continued.

No.	Date.	Name and address of contractor.	Location.	To construct—
2521	1897. Nov. 5	John Jacoby, Wilmington, Del.	O NW., Twenty-fifth to Twenty-sixth street; M, Thirtieth to Thirty-second street NW.	190 linear feet 4 feet diameter; 625 linear feet 24-inch pipe.
2522	Nov. 8	Adam McCandlish, Washington, D. C.	Four-and-a-half street NW., crossing E street and between School and E streets.	75 linear feet 2 feet 9 inches by 4 feet 1½ inches, and 276 linear feet 2 by 3 foot sewer.
2523	Nov. 11	Lyons Bros., Washington, D. C.	Morris road, crossing Nichols avenue and east of same.	120 linear feet 2 foot 6 inch by 3 foot 9 inch and 500 linear feet 2 by 3 foot sewer.
2542	1898. May 17	R. M. Moore & Co., Washington, D. C.	Klingie road and private roads in Cleveland Park.	2,100 linear feet 15-inch, 2,400 linear feet 12-inch, and 1,500 linear feet 8-inch pipe sewer.
2543	May 21	Jones, Pollard & Co., Baltimore, Md.	Water street and across old Naval Observatory grounds, between Twenty-first and Twenty-fifth streets.	1,500 linear feet 6 foot 6 inch diameter sewer.

Statement of contracts for furnishing construction material for the fiscal year 1898.

No.	Date.	Name and address of contractor.	To furnish—
2409	1897. July 9	The Washington Brick Co., Washington, D. C.	700,000 sewer bricks.
2416	June 30	Johnson Hellen, Washington, D. C.	25,000 cubic yards of sand and gravel.
2439	July 22	The McNeal Pipe and Foundry Co., Burlington, N. J.	50,000 feet of 6-inch and 10,000 feet of 4-inch water pipe.
2444	July 26	Charles Ford, Washington, D. C.	600,000 sidewalk paving brick.
2451	July 27	M. J. Drummond, New York	4,000 feet 12-inch water pipe.
2457	July 27	Camden Clay Co., Spilman, W. Va.	200,000 vitrified paving blocks.
2466	July 30	Mack Manufacturing Co., West Virginia.	Terra-cotta material.
2480	Aug. 10	John M. Mack, Philadelphia, Pa.	500,000 vitrified paving blocks.
2481	Aug. 14	William A. Richards, Washington, D. C.	4,000 cubic yards paving sand and 4,000 cubic yards concrete sand.
2490	Aug. 18	John Miller, Washington, D. C.	600,000 sidewalk paving brick.
2494	Aug. 18	Savage Fire Brick Co., Keystone Junction, Pa.	540,000 vitrified sewer invert bricks.
2498	Aug. 25	Washington Asphalt Block and Tile Co., Washington, D. C.	300,000 asphalt paving blocks.
2499	Aug. 24	John B. Lord, Washington, D. C.	6,000 cubic yards screened gravel and 700 cubic yards building sand.
2501	Aug. 12	McMahan, Porter & Co., New Cumberland, W. Va.	500,000 vitrified paving blocks.
2503	Sept. 1	Atlas Cement Co., New York	3,500 barrels Portland cement.
2509	Sept. 15	H. A. Jones & Co., Washington, D. C.	6,000 barrels Class A and 18,000 barrels Class B natural cement.
2519	Oct. 30	S. C. Doby, Lithonia, Ga.	38,000 linear feet 6 by 20 inch and 30,000 linear feet 8 by 8 inch granite curbing.
2533	1898. Jan. 6	Washington Asphalt Block and Tile Co., Washington, D. C.	150,000 asphalt paving blocks.

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Statement of construction, hauling, and miscellaneous contracts for the fiscal year 1898.

No.	Date.	Name and address of contractor.	Description.
	1897.		
2417	June 30	United States Electric Lighting Co., Washington, D. C.	Furnish, operate, and maintain electric arc lamps.
2450	July 28	Pavarini & Greer, Washington, D. C.	Construct frame school building on Connecticut avenue extended, near Chevy Chase.
2487	Aug. 18	Littlefield, Alvord & Co., Washington, D. C.	Hauling construction material.
2510	Sept. 25	James M. Dunn, Washington, D. C.	Construct engine house in Anacostia for fire department.
2512	July 1	Daggett & Dugan, Washington, D. C.	Sprinkle, sweep, and clean carriage-ways of improved streets and avenues for two years from June 30, 1897.
2513	....do....	....do....	Sprinkle, sweep, and clean, by hand, carriage ways of improved streets and avenues.
2514	....do....	....do....	Sprinkle, sweep, and clean paved alley-ways.
2516	Oct. 9	La France Fire Engine Co., New York	Furnish fire engine.
2517	Oct. 13	American Fire Engine Co., Seneca Falls, N. Y.	Do.
2526	Nov. 16	Andrew Gleeson and Robert T. Humphrey, Washington, D. C.	Construct engine house on Eighth street NW., between D and E streets, for fire department.
2527	Nov. 8	Baldwin & Peake, Washington, D. C.	Construct school building on the southeast corner of First and Quincy streets, NE.
2529	Nov. 26	H. I. Gregory, Washington, D. C.	Furnish and set Smead heating and ventilating apparatus in school building at First and Quincy streets NE.
	1898.		
2534	Feb. 12	Baldwin & Peake, Washington, D. C.	Construct school building on Sixth street, between B and C streets NE.
2535	Feb. 17	H. I. Gregory, Washington, D. C.	Furnish and set Smead heating and ventilating apparatus in school building on Sixth street, between B and C streets NE.
2536	Mar. 4	James C. McGuire, New York City	Widen the P Street Bridge over Rock Creek.
2537	Mar. 14	Andrew Gleeson, Washington, D. C.	Construct school building on Marshall street, Mount Pleasant.
2538	Mar. 22	Baldwin & Peake, Washington, D. C.	Construct school building on the southeast corner of Twenty-fourth and F streets NW.
2539	Mar. 24	H. I. Gregory, Washington, D. C.	Furnish and set Smead heating and ventilating apparatus in school building at Twenty-fourth and F streets NW.
2540	....do....	....do....	Furnish and set Smead heating and ventilating apparatus in school building on Marshall street, Mount Pleasant.
2541	Apr. 16	Pavarini & Greer	Construct building for Industrial Home School.
2544	May 23	Eugene M. Tilden, Washington, D. C.	Furnish dog tags.
2545	May 24	Pavarini & Greer, Washington, D. C.	Construct wagon shed and brick wall and reconstruct stable in square 175.

Statement of contracts for general supplies for the fiscal year 1898.

No.	Date.	Name and address of contractor.	To furnish—
	1897.		
2410	July 12	H. I. Gregory, Washington, D. C.	Tinware.
2411	July 15	H. P. Pillsbury, Washington, D. C.	Forage.
2412	July 14	Wm. Hahn & Co., Washington, D. C.	Boots and shoes.
2414	July 16	Riley & Walker, Washington, D. C.	Lumber.
2415	July 17	C. G. Stott & Co., Washington, D. C.	Stationery.
2418	July 19	F. P. May & Co., Washington, D. C.	Tinware.
2419	....do....	....do....	Saddlery.
2420	....do....	....do....	Hardware.
2421	July 20	Conrad Becker, Washington, D. C.	Saddlery.
2422	....do....	Dunlap Printing Co., Philadelphia, Pa.	Blank forms.
2423	July 17	Richard & Co., Washington, D. C.	Groceries.
2424	July 20	Lansburgh & Bro., Washington, D. C.	Dry goods.
2425	July 19	F. A. Schmidt, Washington, D. C.	Stationery.
2426	July 21	S. R. Waters, Washington, D. C.	Groceries.

OPERATIONS OF THE ENGINEER DEPARTMENT, D. C. 205

Statement of contracts for general supplies for the fiscal year 1898—Continued.

No.	Date.	Name and address of contractor.	To furnish—
	1897.		
2427	July 19	T. T. Keane, Washington, D. C.	Fresh beef.
2428	July 17	Easton & Rupp, Washington, D. C.	Stationery.
2429	July 20	Lansburgh & Bro., Washington, D. C.	Saddlery.
2430	July 22	Mortimer Du Perow, Washington, D. C.	Telegraph and telephone supplies.
2431	July 23	T. Somerville & Sons, Washington, D. C.	Plumbers' material.
2432	July 21	Charles Werner, Washington, D. C.	Fuel.
2433	July 22	B. Rich & Sons, Washington, D. C.	Dry goods.
2434	do	do.	Boots and shoes.
2435	July 19	W. J. C. Dulany, Baltimore, Md.	Hardware.
2436	do	do.	Schoolbooks.
2437	do	do.	Stationery.
2438	do	John Kennedy, Washington, D. C.	Fuel.
2440	July 21	R. P. Clarke, Washington, D. C.	Dry goods.
2441	July 24	Lutz & Co., Washington, D. C.	Saddlery.
2442	July 19	J. B. Lambie, Washington, D. C.	Hardware.
2443	July 24	V. Baldwin Johnson, Washington, D. C.	Fuel.
2445	do	J. T. Springman & Bro., Washington, D. C.	Miscellaneous castings.
2447	July 20	R. C. Ballantyne, Washington, D. C.	Schoolbooks.
2448	do	do.	Stationery.
2449	July 24	Edward Stevens, Washington, D. C.	Drugs.
2452	do	Standard Oil Co., New Jersey.	Oil.
2453	July 21	John Wanamaker, Philadelphia, Pa.	Dry goods.
2454	July 26	T. A. Tschiffely, jr., Washington, D. C.	Drugs.
2455	do	Mitchell & Reed, Washington, D. C.	Plumbers' material.
2456	July 21	J. R. Buckalew, Washington, D. C.	Stationery.
2458	July 26	T. W. Smith, Washington, D. C.	Lumber.
2459	do	M. W. Beveridge, Washington, D. C.	Hardware.
2460	July 22	Hyman Powdermaker, Washington, D. C.	Fresh beef.
2461	do	Chas. S. Braisted, New York City	Stationery.
2462	do	Mackall Bros. & Flemer, Washington, D. C.	Glass, paints, and varnish.
2463	do	do.	Drugs.
2464	July 30	Hartman & Cadick, Washington, D. C.	Printing.
2465	July 21	Hugh Reilly, Washington, D. C.	Glass, paints, and varnish.
2467	July 29	John B. Daish, Washington, D. C.	Groceries.
2468	July 30	W. T. Galliher & Bro., Washington, D. C.	Lumber.
2469	Aug. 2	Anton Lully, Washington, D. C.	Fresh beef.
2470	July 28	Church & Stephenson, Washington, D. C.	Lumber.
2471	July 29	John B. Daish, Washington, D. C.	Forage.
2472	July 30	G. F. Muth & Co., Washington, D. C.	Drugs.
2473	do	do.	Glass, paints, and varnish.
2474	Aug. 4	Frank Hume, Washington, D. C.	Groceries.
2475	July 1	Jordan & Christie, Boston, Mass.	Hardware.
2476	Aug. 9	James E. Stake, Washington, D. C.	Groceries.
2478	July 28	J. C. Ergood & Co., Washington, D. C.	Do.
2479	Aug. 13	Charles E. Lyman, Washington, D. C.	Meat.
2482	July 30	Blum Bros., Washington, D. C.	Dry goods.
2483	do	do.	Furniture.
2484	do	do.	Tinware.
2485	do	do.	Hardware.
2486	do	do.	Groceries.
2488	July 24	G. A. Shehan, Washington, D. C.	Lumber.
2495	Aug. 20	W. M. Galt & Co., Washington, D. C.	Forage.
2496	do	do.	Groceries.
2504	Sept. 13	W. B. Moses & Sons, Washington, D. C.	Furniture.
2505	July 26	Metropolitan Job Printing Office, New York City	Blank forms.
2506	July 24	W. A. Pate, Washington, D. C.	Hardware.
2507	do	do.	Telegraph and telephone supplies.
2508	do	do.	Saddlery.
2511	July 25	Johnson Bros., Washington, D. C.	Fuel.
2530	Nov. 9	Great Falls Ice Co., Washington, D. C.	Ice.
2532	Dec. 7	Austin Nichols & Co., Washington, D. C.	Groceries.

Proposals for paving Columbia road between Florida avenue and Eighteenth street with sheet asphalt, opened July 10, 1897.

Bidder.	Asphalt pavement.	Vitrified-block gutter.	Total cost.
Cranford Paving Co.	\$1.70	\$1.40	\$17,480.00
Barber Asphalt Paving Co.	1.80	1.40	18,380.00
Eastern Bermudez Asphalt Paving Co.	1.78	1.30	18,066.00
Southern Asphalt Paving Co.	1.77	2.25	19,209.00

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Proposals for paving intersection of Columbia road and Eighteenth street extended, opened October 21, 1897.

Bidder.	Asphalt pavement on 6-inch hydraulic base.	Vitrified-brick gutter.
Cranford Paving Co.....	\$1.70	\$1.40
Barber Asphalt Paving Co.....	1.80	1.40

Proposals for grading Baltimore and Twentieth streets and Kenesaw avenue and Park road, opened at 12 o'clock noon, November 10, 1897.

Bidder.	Baltimore and Twentieth streets.	Kenesaw avenue and Park road.
	<i>Cubic yard.</i>	<i>Cubic yard.</i>
William H. H. Allen.....	\$0.20	\$0.17½
George B. Mullen.....	.....	.14½
M. P. Quinn.....	.43	.37
Ezra A. Mathers.....	.23.9	.21.6
Andrew Gleason.....	.20	.15
James Frawley.....	.17½	.21½
M. F. Talty.....	.20	.15½

Proposals for widening and repaving Tenth street NW., from D to F, opened November 20, 1897.

Bidder.	Asphalt paving, 2,200 square yards.		Block gutters, 440 square yards.		Resurfacing 1,600 square yards.		Total.
	Price.	Amount.	Price.	Amount.	Price.	Amount.	
Cranford Paving Co.....	\$1.75	\$3,850.00	\$1.40	\$616.00	\$1.45	\$2,320.00	\$6,786.00
Barber Asphalt Paving Co....	1.77	3,894.00	1.46	638.00	1.48	2,368.00	6,900.00

Proposals for widening P-street Bridge, opened February 3, 1898.

Bidder.	Structural steel erected, 110,000 pounds.		New rubble masonry, 20 cubic yards.		Cement sidewalks, 150 square yards.		Sheet-asphalt roadway, 250 square yards.		Iron railing erected, 350 linear feet.		Total amount of bid.	Time of completion from date of contract.
	Per pound.	Amount.	Per yard.	Amount.	Per yard.	Amount.	Per yard.	Amount.	Per foot.	Amount.		
	<i>Ots.</i>											<i>Days.</i>
James C. McGuire	2.89	\$3,179.00	\$7.00	\$140.00	\$2.50	\$375.00	\$2.40	\$600.00	\$2.30	\$805.00	\$5,099.00	100
Penn Bridge Co...	2.80	3,080.00	9.85	197.00	2.75	412.50	2.65	662.50	2.83	990.50	5,342.50	90
Youngstown												
Bridge Co.....	3.42	3,762.00	5.90	118.00	2.50	375.00	2.30	575.00	2.25	787.50	5,617.50	90
R. H. Hood.....	3.80	4,180.00	8.00	160.00	2.00	300.00	2.00	500.00	2.00	700.00	5,840.00	90
Structural Iron Co.	4.2	4,620.00	5.00	100.00	2.50	375.00	2.30	575.00	1.90	685.00	6,335.00	70
Benner & Opdyke.	3.45	3,795.00	7.75	155.00	2.65	397.50	2.65	662.50	2.75	962.50	5,972.00	120

Proposals for improving Baltimore street, from Columbia road to Twentieth street, and Twentieth street, from Baltimore and Cincinnati streets, opened June 11, 1898.

Bidder.	Hauling and setting 8 by 8 inch curb.	Laying vitrified-block gutters on 6-inch hydraulic base.	Laying asphalt pavement on 6-inch hydraulic base, 2-inch binder, 2½-inch surface.
Barber Asphalt Paving Co.....	\$0.48	\$1.40	\$1.78
Cranford Paving Co.....	.50	1.45	1.45

Proposals for improving South Capitol street, between H and K streets, opened June 11, 1898.

Bidder.	Paving granite-block roadway.	Roller to be used.	Weight of roller.	Remarks.
			<i>Tons.</i>	
W. F. Brenizer.....	0.61	Steam ..	5 and 10	Evidence as to steam roller furnished.
Andrew Gleeson.....	1.24	....do ...	10	
Cranford Paving Co .....	.93	....do ...	5 or 10	Own specification roller.
M. F. Talty	1.07	....do ...	10	
Lyon Bros .....	.845	....do ...	5 and 10	In paper 14135, E. D. state that they have made arrangements with Barber Asphalt Paving Co. to use their roller.
Washington Asphalt Block and Tile Co.	.63	....do ...	10 or more	
O'Day & Curran.....	.69	....do ...	10	

Schedule of proposals for construction of sewers, opened October 23, 1897.

Bidder.	Sewer A.								Total.
	Excavation above sewer subgrade. (13,700.)		Brick masonry laid in national-cement mortar. (784.)		Vitrified-brick masonry laid in Portland-cement mortar. (197.)		Concrete masonry. (457.)		
	Bid.	Cost.	Bid.	Cost.	Bid.	Cost.	Bid.	Cost.	
John P. Larguey	\$0.70	\$9,590.00	\$8.50	\$8,664.00	\$17.00	\$3,349.00	\$5.50	\$2,513.50	\$22,116.50
B. J. Sullivan.....	.74	10,138.00	9.00	7,056.00	20.00	3,940.00	6.50	2,970.50	24,104.50
Lyons Bros .....	.59	8,083.00	8.40	6,585.60	16.25	3,201.25	7.25	3,313.25	21,183.10
R. M. Moore & Co .....	.49	6,713.00	8.33	6,530.72	16.95	3,339.15	4.84	2,211.88	18,794.75
Andrew Gleeson.....	.70	9,590.00	8.00	6,272.00	18.00	3,546.00	5.25	2,399.25	21,807.25
E. A. Mathers.....	.51	6,987.00	9.10	7,134.40	18.35	3,614.95	5.85	2,673.45	20,409.80
John Jacoby .....	.40	5,480.00	8.00	6,272.00	18.00	3,546.00	5.00	2,285.00	17,583.00
Reich & Deehan .....	.53	7,261.00	8.40	6,585.60	17.25	3,398.25	5.40	2,467.80	19,712.65
Adam McCandlish.....	.95	13,015.00	9.00	7,056.00	18.00	3,546.00	5.50	2,513.50	26,130.50
E. G. Gummel .....	.50	6,850.00	7.87	6,170.80	16.00	3,152.00	4.70	2,147.90	18,319.98
B. J. Coyle .....	.36	4,932.00	8.20	6,428.80	16.40	3,230.80	5.20	2,376.40	16,968.00

Bidder.	Sewer B.								Total.
	Excavation above sewer subgrade. (1,700.)		Brick masonry laid in national-cement mortar. (114.)		Vitrified-brick masonry laid in Portland-cement mortar. (21.)		Concrete masonry. (74.)		
	Bid.	Cost.	Bid.	Cost.	Bid.	Cost.	Bid.	Cost.	
Lyons Bros	\$0.50	\$850.00	\$8.40	\$957.60	\$17.00	\$357.00	\$5.00	\$370.00	\$2,534.00
R. M. Moore & Co .....	.60	1,020.00	8.44	862.16	17.33	363.93	4.97	367.78	2,713.87
Andrew Gleeson .....	.50	850.00	8.00	912.00	18.00	378.00	5.50	407.00	2,547.00
John Jacoby .....	.60	1,020.00	8.50	969.00	18.00	378.00	5.50	407.00	2,774.00
Reich & Deehan .....	.50	850.00	8.75	997.50	17.25	362.25	5.40	399.60	2,609.35
Adam McCandlish54	918.00	8.00	980.40	15.00	315.00	4.75	351.50	2,564.90
E. G. Gummel44	748.00	7.76	884.64	16.00	336.00	4.48	327.82	2,296.46

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Schedule of proposals for construction of sewers, opened October 23, 1897—Continued.

Sewer C.									
Bidder.	Excavation above sewer subgrade. (1,200.)		Brick masonry laid in natural cement mortar. (102.)		Vitrified brick masonry laid in Portland-cement mortar. (14.)		Concrete masonry. (68.)		Total.
	Bid.	Cost.	Bid.	Cost.	Bid.	Cost.	Bid.	Cost.	
Lyons Bros	\$0.40	\$480.00	\$8.45	\$861.90	\$16.00	\$324.00	\$6.00	\$408.00	\$1,973.90
R. M. Moore & Co .....	.79	948.00	8.97	914.94	18.94	265.16	5.97	405.96	2,534.06
Andrew Gleeson .....	.60	720.00	8.50	867.00	19.00	266.00	5.75	391.00	2,244.00
John Jacoby .....	.50	690.00	8.25	841.50	18.00	252.00	6.00	408.00	2,101.50
Reich & Deehan .....	.45	540.00	8.40	856.80	17.25	241.50	5.40	367.20	2,005.50
Adam McCandlish .....	.75	900.00	8.70	887.40	15.50	217.00	5.00	348.00	2,344.40
E. G. Gummel	1.00	1,200.00	8.50	867.00	18.00	252.00	5.50	374.00	2,693.00

Sewer D.									
Bidder.	Excavating above sewer subgrade. (2,400.)		Brick masonry laid in natural cement mortar. (184.)		Vitrified brick masonry laid in Portland cement mortar. (25.)		Concrete masonry. (122.)		Total.
	Bid.	Cost.	Bid.	Cost.	Bid.	Cost.	Bid.	Cost.	
J. P. Larguey	\$0.50	\$1,200.00	\$8.50	\$1,564.00	\$17.00	\$425.00	\$5.50	\$671.00	\$3,860.00
B. J. Sullivan .....	.40	960.00	8.00	1,472.00	15.60	390.00	5.00	610.00	3,432.00
Lyons Bros .....	.50	1,200.00	8.40	1,545.60	17.00	425.00	5.90	719.80	3,890.40
R. M. Moore & Co .....	.57	1,368.00	8.27	1,521.68	16.39	409.75	4.74	578.28	3,877.71
Andrew Gleeson .....	.50	1,200.00	8.00	1,472.00	16.00	400.00	4.95	603.90	3,675.90
John Jacoby .....	.50	1,200.00	8.50	1,564.00	18.00	450.00	5.50	671.00	3,885.00
Ruch & Deehan .....	.50	1,200.00	8.40	1,545.60	17.25	431.25	5.40	658.80	3,835.65
Adam McCandlish .....	.48	1,152.00	8.35	1,536.40	15.00	375.00	4.75	579.50	3,642.90
E. G. Gummel .....	.44	1,056.00	7.76	1,427.84	16.00	400.00	4.40	536.80	3,420.04
B. J. Coyle .....	.45	1,080.00	8.20	1,508.80	16.40	410.00	5.20	634.40	3,633.20

Sewer E.									
Bidder.	Excavating above sewer subgrade. (650.)		Brick masonry laid in natural cement mortar. (61.)		Vitrified brick masonry laid in Portland cement mortar. (8.)		Concrete masonry. (39.)		Total.
	Bid.	Cost.	Bid.	Cost.	Bid.	Cost.	Bid.	Cost.	
Lyons Bros	\$0.65	\$422.50	\$8.75	\$533.75	\$19.00	\$152.00	\$7.00	\$273.00	\$1,381.25
R. M. Moore & Co .....	.67	435.50	8.59	523.99	16.87	134.96	4.73	184.47	1,278.92
Andrew Gleeson .....	.65	422.50	8.50	518.50	20.00	160.00	6.00	234.00	1,335.00
John Jacoby .....	.60	390.00	9.00	549.00	18.00	144.00	6.00	234.00	1,317.00
Ruch & Deehan .....	.65	422.50	8.40	512.40	17.25	138.00	5.40	210.60	1,283.50
Adam McCandlish .....	.65	422.50	8.75	533.75	15.00	120.00	4.75	185.25	1,261.50
E. G. Gummel .....	.75	487.50	8.00	488.00	16.00	128.00	4.50	175.50	1,279.00

Sewer F.									
Bidder.	Excavating above sewer subgrade. (175.)		Brick masonry laid in natural cement mortar. (72.)		Vitrified brick masonry laid in Portland cement mortar. (17.)		Concrete masonry. (40.)		Total.
	Bid.	Cost.	Bid.	Cost.	Bid.	Cost.	Bid.	Cost.	
Lyons Bros	\$0.30	\$52.50	\$8.50	\$612.00	\$17.00	\$289.00	\$6.00	\$240.00	\$1,193.50
R. M. Moore & Co .....	.29	50.75	8.44	607.68	16.37	278.29	4.89	195.60	1,132.32
Andrew Gleeson	1.00	175.00	9.00	648.00	21.00	357.00	6.50	260.00	1,440.00
John Jacoby .....	.40	70.00	8.00	576.00	18.00	306.00	4.50	180.00	1,132.00
Ruch & Deehan .....	.40	70.00	9.50	684.00	19.50	331.50	6.50	260.00	1,345.50
Adam McCandlish .....	.75	131.25	9.00	648.00	16.00	272.00	5.75	230.00	1,281.25
E. G. Gummel	1.00	175.00	9.00	648.00	20.00	340.00	6.00	240.00	1,403.00

Schedule of proposals for construction of sewers, opened October 23, 1897—Continued.

Bidder.	Sewer G.									Total.
	Excavating above sewer subgrade. (1,630.)		Brick masonry laid in natural cement mortar. (166.)		Vitrified brick masonry laid in Portland cement mortar. (68.)		Concrete masonry. (109.)			
	Bid.	Cost.	Bid.	Cost.	Bid.	Cost.	Bid.	Cost.		
Lyons Bros	\$0.60	\$978.90	\$8.50	\$1,411.00	\$19.00	\$532.00	\$6.50	\$708.50	\$3,629.50	
B. M. Moore & Co. ....	.57	923.10	8.33	1,382.78	16.73	468.44	4.74	516.06	3,296.98
Andrew Gleeson .....	.80	1,304.00	9.50	1,577.00	20.00	560.00	6.25	681.25	4,122.25
John Jacoby .....	.55	896.50	9.00	1,494.00	18.50	518.00	6.00	654.00	3,562.50
Ruch & Deehan	1.00	1,630.00	8.75	1,452.50	17.50	490.00	5.40	588.60	4,161.10	
Adam McCandlish .....	.85	1,385.50	8.50	1,411.00	15.00	420.00	5.00	545.00	3,761.50
E. G. Gummel .....	.50	815.00	8.00	1,328.00	16.00	448.00	4.60	501.40	3,092.40

Bidder.	Sewer H.					Sewer I.				
	18-inch sewer. (605.)		Manhole. (5.)		Total.	24-inch sewer. (625.)		Manhole. (4.)		Total.
	Bid.	Cost.	Bid.	Cost.		Bid.	Cost.	Bid.	Cost.	
John Jacoby	\$1.60	\$968.00	\$30.00	\$150.00	\$1,118.00	\$1.90	\$1,187.50	\$35.00	\$140.00	\$1,327.50
Ruch & Deehan	2.88	1,742.40	40.00	200.00	1,942.40	3.60	2,250.00	40.00	160.00	2,410.00
Adam McCandlish	1.40	847.00	25.00	125.00	1,972.00	2.50	1,562.50	35.00	140.00	1,702.50
E. G. Gummel	1.35	816.75	25.00	125.00	941.75	2.50	1,562.50	25.00	125.00	1,687.50

RECAPITULATION—AWARDS MADE AS FOLLOWS:

R. J. Coyle, sewer A	\$16,968.00
E. G. Gummel, sewer B	2,296.46
E. G. Gummel, sewer D	3,420.64
E. G. Gummel, sewer G	3,092.40
E. G. Gummel, sewer H	841.75
Lyons Bros., sewer C	1,973.90
Adam McCandlish, sewer E	1,261.50
John Jacoby, sewer F	1,132.00
John Jacoby, sewer I	1,327.50

Proposals for constructing sewers in Klinge road and private roads of Cleveland Park, opened April 30, 1898.

Bidder.	2,100 feet 15-inch.		6 manholes.		Total.
	Price.	Cost.	Price.	Cost.	
R. M. Moore & Co	\$0.59	\$1,239.00	\$15.00	\$90.00	\$1,329.00
Adam McCandlish .....	.68	1,428.00	18.00	108.00	1,536.00
Warren F. Brenizer .....	.735	1,543.50	19.00	114.00	1,657.50
E. G. Gummel .....	.77	1,617.00	20.00	120.00	1,737.00
Andrew Gleeson .....	.67	1,407.00	16.00	96.00	1,503.00
James A. Coyle .....	.84	1,764.00	15.00	90.00	1,854.00
Washington Asphalt Block and Tile Co .....	.85	1,785.00	17.00	102.00	1,887.00
John Jacoby .....	.85	1,785.00	17.00	102.00	1,887.00
John P. Larguey .....	.97	2,037.00	16.00	96.00	2,133.00
Lyons Bros .....	.74	1,554.00	15.00	90.00	1,644.00

Bidder.	2,400 feet 12-inch.		9 manholes.		Total.
	Price.	Cost.	Price.	Cost.	
R. M. Moore & Co	\$0.55	\$1,320.00	\$15.00	\$135.00	\$1,455.00
Adam McCandlish .....	.58	1,392.00	12.00	162.00	1,554.00
Warren F. Brenizer .....	.635	1,524.00	19.00	171.00	1,695.00
E. G. Gummel .....	.62	1,468.00	20.00	180.00	1,668.00
Andrew Gleeson .....	.67	1,508.00	16.00	144.00	1,752.00
James A. Coyle .....	.70	1,530.00	15.00	135.00	1,815.00
Washington Asphalt Block and Tile Co .....	.75	1,680.00	17.00	153.00	1,833.00
John Jacoby .....	.75	1,680.00	17.00	153.00	1,833.00
John P. Larguey .....	.83	1,892.00	16.00	144.00	2,136.00
Lyons Bros .....	.85	2,040.00	15.00	135.00	2,175.00

210 OPERATIONS OF THE ENGINEER DEPARTMENT, D. C.

Proposals for constructing sewers in Kingle road and private roads of Cleveland Park, opened April 30, 1898—Continued.

Bidder.	1,500 feet 8 inch.		4 manholes.		Total.
	Price.	Cost.	Price.	Cost.	
R. M. Moore & Co	\$0. 47	\$705. 00	\$15. 00	\$80. 00	\$765. 00
Adam McCandlish .....	. 54	810. 00	18. 00	72. 00	882. 00
Warren F. Brenizer .....	. 54	810. 00	19. 00	76. 00	886. 00
E. G. Gummel .....	. 56	840. 00	20. 00	80. 00	920. 00
Andrew Gleeson .....	. 65	\$75. 00	16. 00	64. 00	1, 039. 00
James A. Coyle .....	. 60	900. 00	15. 00	60. 00	960. 00
Washington Asphalt Block and Tile Co .....	. 55	825. 00	17. 00	68. 00	893. 00
John Jacoby .....	. 75	1, 125. 00	17. 00	68. 00	1, 193. 00
John P. Larguey .....	. 83	1, 245. 00	16. 00	64. 00	1, 309. 00
Lyons Bros .....	. 90	1, 350. 00	15. 00	60. 00	1, 410. 00

Proposals for constructing sewer as extension of Georgetown main sewer, opened April 30, 1898.

Bidder (Sewer B).	Excavation above subgrade.		Brick masonry in natural cement mortar.		Vitrified brick masonry in Portland cement mortar.		Concrete masonry, broken stone, and gravel.	
	Price.	Cost.	Price.	Cost.	Price.	Cost.	Price.	Cost.
John Jacoby	\$2. 00	\$300. 00	\$10. 00	\$1, 100. 00	\$30. 00	\$340. 00	\$5. 00	\$1, 000. 00

Bidder (Sewer B).	Rubble masonry.		Piling.		Lumber in place and secured for caps.		B. S. coping.		Total.
	Price.	Cost.	Price.	Cost.	Price.	Cost.	Price.	Cost.	
John Jacoby	\$5. 00	\$75. 00	\$0. 40	\$160. 00	\$25. 00	\$62. 50	\$0. 40	\$9. 60	\$4, 147. 10

Bid of John Jacoby rejected, and sewer will be readvertised.

Proposals for constructing sewer in line of Water street across Observatory Grounds, opened April 30, 1898.

Bidder (Sewer A).	Excavation above subgrade.		Rock excavation.		Brick masonry in natural cement mortar.	
	Price.	Cost.	Price.	Cost.	Price.	Cost.
Jones, Pollard & Co	\$0. 40	\$3, 680. 00	\$1. 75	\$14, 525. 00	\$8. 00	\$6, 800. 00
John Jacoby .....	. 50	4, 600. 00	2. 25	18, 675. 00	8. 50	7, 225. 00
Lyons Bros	1. 00	9, 200. 00	5. 00	41, 500. 00	9. 50	8, 075. 00

Bidder (Sewer A).	Concrete masonry, broken stone, and gravel.		Concrete masonry, gravel.		Vitrified brick masonry in Portland cement mortar.		Total.
	Price.	Cost.	Price.	Cost.	Price.	Cost.	
Jones, Pollard & Co	\$5. 00	\$2, 000. 00	\$5. 00	\$2, 000. 00	\$17. 00	\$2, 550. 00	\$29, 555. 00
John Jacoby	4. 25	1, 700. 00	4. 25	1, 700. 00	18. 00	2, 700. 00	34, 900. 00
Lyons Bros	7. 00	3, 000. 00	7. 00	2, 800. 00	18. 75	2, 812. 50	64, 587. 50

Proposals for the construction of Tiber Creek and New Jersey avenue high level intercepting sewer, opened July 10, 1897.

Bidder.	Excavation.		Red-brick masonry.		Vitrified brick masonry, A, 1,332 cubic yards; B, 1,358 cubic yards.	Concrete masonry.		Rubble-stone masonry, A, 9,933 cubic yards; B, 10,131 cubic yards.
	Sewer A, 179,300 cubic yards.	Sewer B, 188,300 cubic yards.	Rubble-masonry section, A, 10,325 cubic yards; B, 10,528 cubic yards.	Concrete section, A, 12,149 cubic yards; B, 12,388 cubic yards.		Rubble-masonry section, A, 5,667 cubic yards; B, 5,779 cubic yards.	Concrete section, A, 13,776 cubic yards; B, 14,050 cubic yards.	
J. K. Murphy	\$0.52	\$0.52	\$8.40	\$8.40	\$16.90	\$4.56	\$4.56	\$6.00
Jones, Pollard & Co.....	.57	.59	8.16	8.16	17.00	4.72	4.72	5.40
Moore, Little & Co.....	.59	.59	8.33	8.33	15.49	4.73	4.73	4.99
John Jacoby.....	.55	.55	8.00	8.00	19.00	5.00	5.00	6.00
The Cranford Paving Co.....	.65	.65	7.60	7.60	17.00	5.60	5.60	8.00
Talty & Gummel.....	.70	.70	9.07	9.07	17.53	5.43	5.43	7.00
B. J. Coyle.....	.70	.72	9.00	9.00	21.00	5.70	5.70	6.60
Andrew Gleeson.....	.75	.75	8.50	8.50	19.00	5.20	5.20	6.00
Shipman & Delaney &.....	1.00	1.00	7.50	7.50	18.00	6.50	6.50	7.50

Bidder.	Total amount of bid.			
	Sewer A.		Sewer B.	
	Rubble-masonry section.	Concrete section.	Rubble-masonry section.	Concrete section.
J. K. Murphy.....	\$287,916.32	\$280,616.96	\$296,439.64	\$288,993.40
Jones, Pollard & Co.....	289,483.44	289,003.56	302,075.76	301,585.08
Moore, Little & Co.....	288,797.51	292,781.33	297,719.02	301,780.96
John Jacoby.....	294,456.00	289,995.00	303,272.00	298,721.00
The Cranford Paving Co.....	328,858.20	308,667.00	338,904.20	318,309.80
Talty & Gummel.....	342,810.52	333,855.07	353,401.67	344,266.40
B. J. Coyle.....	344,266.70	341,846.20	358,650.90	355,671.00
Andrew Gleeson.....	336,611.90	334,684.70	347,351.80	345,385.00
Shipman & Delaney &.....	392,046.50	383,937.50	405,250.00	396,979.00

a Would tunnel part of Sewer B, at option of Commissioners, at same price as bid amounts to per foot.

Proposals for repairs to concrete pavements, opened April 30, 1898.

Class of work.	Approximate quantities.	Barber Asphalt Paving Co.		Cranford Paving Co.	
		Price.	Cost.	Price.	Cost.
Asphalt pavement, 6-inch base, 2½-inch asphalt.	16,000 square yards.	\$1.78	\$28,480	\$1.69	\$27,040
Asphalt surface, 2½ inches.....	18,000 square yards.	.90	16,200	.85	15,300
Asphalt surface, 2 inches.....	5,000 square yards.	.80	4,000	.74	3,700
Asphalt surface, in cart.....	50,000 cubic feet.....	.63	31,500	.52	26,000
Asphalt binder, in cart.....	95,000 cubic feet.....	.315	29,925	.30	28,500
Asphalt surface, burner method.....	16,000 cubic feet.....	1.00	16,000	.95	15,200
Total.....			126,105		115,740

Proposals for laying sheet-asphalt pavements, opened July 31, 1897—Continued.

Location.			Southern Asphalt Paving Co.		Fruin-Bambrick Construction Co.	
Street.	From—	To—	Asphalt.	Vitrified brick gutter.	Asphalt.	Vitrified brick gutter.
I NW	New Hampshire avenue	Twenty-sixth	\$1.79	\$1.50	\$1.72	\$0.96
C NW	Eleventh	Twelfth	1.79	1.50	1.72	.96
Eleventh NW	C	D	1.79	1.50	1.72	.96
Twelfth NW	C	D	1.79	1.50	1.72	.96
Eleventh NW	B	C	1.79	1.50	1.72	.96
Twenty-fifth NW	H	K	1.79	1.50	1.72	.96
T NW	Seventh	Florida avenue	1.79	1.50	1.72	.96
Rhode Island avenue NW.	New Jersey avenue	do	1.79	1.50	1.72	.96
K NW	First	North Capitol	1.79	1.50	1.72	.96
First NW	Pierce	New York avenue	1.79	1.50	1.72	.96
Twenty-second NW	F	Virginia avenue	1.79	1.50	1.72	.96
F NE	Third	Ninth	1.79	1.50	1.72	.96
Fourth NE	K	L	1.79	1.50	1.72	.96
E SE	Thirteenth	Fifteenth	1.79	1.50	1.72	.96
Third SW	I	K	1.79	1.50	1.72	.96
Virginia avenue SW	South Capitol	Delaware avenue	1.79	1.50	1.72	.96
N SW	Four-and-a-half	Sixth	1.79	1.50	1.72	.96
M (n. s.), Georgetown	Thirty-first	Thirty-second	1.79	1.50	1.72	.96
M, Georgetown	Thirty-second	Thirty-third	1.79	1.50	1.72	.96
H, special	Twenty-second	Twenty-third	1.79	1.50	1.72	.96
North Capitol, special	O	Q	1.79	1.50	1.72	.96
Massachusetts avenue, special.	Twenty-second	Sheridan Circle	1.79	1.50	1.72	.96
Spruce and Bohrer, special.	Larch	Florida avenue	1.79	1.50	1.72	.96
For all work ordered			1.59	1.39	1.69	.93

Proposals for grading and macadamizing suburban streets, opened August 10, 1897.

Quantity.	Andrew Gleason.		Charles H. Ealin.		W. H. H. Allen.		Lyons Bros.		M. F. Talby.		Gaskins & Horn.		James Frawley.	
	Price.	Amount.	Price.	Amount.	Price.	Amount.	Price.	Amount.	Price.	Amount.	Price.	Amount.	Price.	Amount.
<i>Twelfth street extended, between Florida avenue and Mount Olivet road.</i>														
7,500	<i>Cents.</i> 35	\$1,875.00	<i>Cents.</i> 23	\$1,725.00	<i>Cents.</i>	<i>Cents.</i>	<i>Cents.</i> 30	\$2,250.00	<i>Cents.</i> 22	\$1,650.00	<i>Cents.</i> 21 1/2	\$1,631.25		
2,400	8	172.00	5	120.00	.....	.....	8	172.00	8	172.00	5	120.00	5	120.00
2,100	17	357.00	20	420.00	.....	.....	25	525.00	20	420.00	17	357.00	18	378.00
600	17	102.00	20	120.00	.....	.....	25	150.00	25	150.00	17	102.00	18	108.00
9,500	90	8,550.00	97	9,215.00	.....	.....	107	10,165.00	110	10,450.00	91	8,645.00	97 1/2	9,262.50

Florida avenue N.E., between M street
and Brentwood road.

Grading.....cubic yards..	2,000	20	\$400.00	23	\$460.00	.....	.....	.....	30	\$600.00	18	\$360.00	16	\$320.00	16½	\$330.00
Removing and piling cobble, flag, brick, r and curb.....square yards..	100	8	8.00	2	2.00	.....	.....	.....	8	8.00	8	8.00	4	4.00	5	5.00
Lay cobble gutters and flag crossings, square yards.....	1,610	16	257.60	16	257.60	.....	.....	.....	25	402.50	20	322.00	17	273.70	17½	281.75
Relaying cobble gutters and flag cross- ings.....square yards..	100	16	16.00	16	16.00	.....	.....	.....	25	25.00	24	24.00	17	17.00	18½	18.50
Set and reset standard curb.....linear feet..	8,132	18	563.76	18	563.76	.....	.....	.....	20	626.40	20	626.40	17	532.44	17½	548.10
12-inch macadam road way.....sq. yards..	7,070	85	6,009.50	92	6,504.40	.....	.....	.....	107	7,564.90	90	6,363.00	86	6,080.20	87	6,150.90
Total.....			7,254.86		7,803.76					9,226.80		7,703.40		7,227.34		7,834.25

a See letter filed with bid, stating price intended to be 13 cents.

216 OPERATIONS OF THE ENGINEER DEPARTMENT, D. C.

Proposals for laying cement sidewalks, opened August 10, 1897.

Bidder.	Per square yard.
Cranford Paving Co.....	\$0.89
F. M. Kemp & Sons.....	1.04
Andrew Gleeson.....	1.18 $\frac{1}{2}$
Cincinnati Granitoid Co.....	1.189

Proposals for furnishing asphalt paving blocks, opened August 19, 1897.

Bidder.	Bid.
Washington Asphalt Block and Tile Co.....	\$57.50
Washington Asphalt Block and Tile Co. (West of Rock Creek, or county).....	59.50
Maryland Pavement Co.....	60.00

Proposal for furnishing asphalt paving blocks, opened December 30, 1897.

Bidder.	Quantity.	Price per 1,000, east of Rock Creek and south of city boundary.	Price per 1,000, west of Rock Creek and in county.
Washington Asphalt Block and Tile Co.....	150,000	\$57.50	\$50.50

Proposals for furnishing cast-iron water pipe, opened July 9, 1897.

Bidder.	12-inch, per ton of 2,210 pounds.	6-inch, per ton of 2,240 pounds.	4-inch, per ton of 2,240 pounds.	Total.	Remarks.
Howard Harrison Iron Co...	\$18.58	\$18.58	\$19.98	\$16,835.40	For the whole quantity only.
Anniston Pipe Foundry Co...	17.95	17.95	17.95	16,155.00	
M. J. Drummond.....	17.45	18.00	18.50	16,166.25	
McNeal Pipe and Foundry Co.	17.90	17.90	17.90	16,110.00	
National Pipe Foundry Co...	19.20	19.20	19.20	17,280.00	On wharf, including unloading.
Chattanooga Foundry and Pipe Works.	19.10	19.10	19.10	17,190.00	
Camden Iron Works.....	18.35	18.75	19.25	16,861.50	On wharf; for rail delivery add 50 cents per ton.

Proposals for furnishing cast-iron water pipe, opened June 13, 1898.

Bidder.	12-inch.	6-inch.	4-inch.	Remarks.
James B. Clark & Sons.....	\$20.70	\$20.70	\$21.00	Informal; no deposit.
American Pipe and Foundry Co.....	17.10	17.10	17.10	
M. J. Drummond & Co.....	17.00	17.45	18.20	
The McNeal Pipe and Foundry Co.....	18.50	19.00	19.50	

Proposals for furnishing sand and gravel, opened July 15, 1897.

Bidder.	Paving sand, per cubic yard.	Concrete sand, per cubic yard.	Building sand, per cubic yard.	Gravel, per cubic yard.
John B. Lord.....	Cents. 25	40	60	45
W. A. Richards.....	22	39	59	49
Columbia National Sand Dredging Co.....	23	40	65	49

OPERATIONS OF THE ENGINEER DEPARTMENT, D. C. 217

Bids for furnishing natural and Portland cements, opened June 24, 1897.

Bidder.	Natural cement.		Portland cement.
	Class A.	Class B.	
	<i>Cents.</i>	<i>Cents.</i>	
Henry A. Jones & Co	62	62	.....
James H. McGill	63	63	\$2.04
Lawrenceville Cement Co	74	69.75	1.855
Grove Lime and Coal Co	69.5	59.5	2.12
J. G. Waters	71	71	.....
Atlas Cement Co .....	.....	.....	1.86
Locher & Co	68	.....	.....
Kelley Island Lime and Transport Co .....	.....	.....	2.39
William J. Donaldson .....	.....	.....	1.96

Proposals for hauling, opened July 15, 1897.

Bidder.	City of Washington.						City of Georgetown.					
	Sand, per yard.	Gravel, per yard.	Paving brick, per 1,000.	Paving block, per 1,000.	6 by 20 curb, per foot.	8 by 8 curb, per foot.	Sand, per yard.	Gravel, per yard.	Paving brick, per 1,000.	Paving block, per 1,000.	6 by 20 curb, per foot.	8 by 8 curb, per foot.
Littlefield, Alvord & Co..	\$0.42	\$0.42	\$1.20	\$1.72	\$0.05	\$0.04	\$0.53	\$0.53	\$1.34	\$1.92	\$0.05	\$0.04
James Frawley .....	.55	.66	1.41	2.35	.....	.....	.75	1.00	2.00	3.10	.....	.....
Geo. W. Knox Express Co.	.50	.50	1.25	1.78	.05	.04	.50	.50	1.40	2.00	.05	.04
Frank E. Hopkins .....	.38	.45	1.25	1.75	.....	.....	.50	.65	1.50	2.25	.....	.....
Richard and Michael Horn .....	.415	.50	1.20	1.80	.....	.....	.53	.75	1.55	2.50	.....	.....

Bidder.	City of Washington, east of Eastern Branch.						County of Washington, between Eastern Branch and Rock Creek, not farther than 1½ miles from city limits.					
	Sand, per yard.	Gravel, per yard.	Paving brick, per 1,000.	Paving block, per 1,000.	6 by 20 curb, per foot.	8 by 8 curb, per foot.	Sand, per yard.	Gravel, per yard.	Paving brick, per 1,000.	Paving block, per 1,000.	6 by 20 curb, per foot.	8 by 8 curb, per foot.
Littlefield, Alvord & Co..	\$0.42	\$0.42	\$1.32	\$1.82	\$0.05	\$0.04	\$0.57	\$0.57	\$1.38	\$2.50	\$0.05	\$0.04
James Frawley .....	.50	1.00	1.45	2.10	.....	.....	.75	1.00	2.33	3.17	.....	.....
Geo. W. Knox Express Co.	.60	.60	1.65	2.20	.06	.05	.60	.60	1.65	2.20	.06	.05
Frank E. Hopkins .....	.40	.475	1.50	2.00	.....	.....	.60	.75	1.50	2.00	.....	.....
Richard and Michael Horn .....	.45	.55	1.55	2.50	.....	.....	.585	.74	1.55	2.55	.....	.....

Bidder.	County of Washington, west of Rock Creek, and not farther than 1 mile from the limits of the city of Georgetown.						Additional haul per mile or fraction thereof.					
	Sand, per yard.	Gravel, per yard.	Paving brick, per 1,000.	Paving block, per 1,000.	6 by 20 curb, per foot.	8 by 8 curb, per foot.	Sand, per yard.	Gravel, per yard.	Paving brick, per 1,000.	Paving block, per 1,000.	6 by 20 curb, per foot.	8 by 8 curb, per foot.
Littlefield, Alvord & Co..	\$0.57	\$0.57	\$1.38	\$2.50	\$0.05	\$0.04	\$0.10	\$0.10	\$0.20	\$0.35	\$0.02	\$0.01
James Frawley .....	.75	1.00	2.00	3.14	.....	.....	.40	.40	1.00	2.00	.06	.05
Geo. W. Knox Express Co.	.60	.60	1.65	2.20	.06	.05	.40	.40	1.00	2.00	.06	.05
Frank E. Hopkins .....	.75	1.00	2.00	2.50	.....	.....	.20	.30	.50	1.00	.....	.....
Richard and Michael Horn .....	.825	1.15	2.27	3.45	.....	.....	.50	.55	.75	1.25	.....	.....

a Conditional; see letter.

218 OPERATIONS OF THE ENGINEER DEPARTMENT, D. C.

Proposals for constructing a frame schoolhouse on the line of Connecticut avenue extended, opened July 6, 1897.

Bidder.	Amount.
Pavarini & Greer	\$8,247
C. Thomas & Son	9,999
William Rothwell	10,568
Richardson & Burgess	12,473

Proposals for constructing an eight-room school building on west side of Sixth street, between B and C streets NE., opened January 3, 1898.

Bidder.	Amount.
James Connor	\$27,465
Gleeson & Humphrey	28,000
Pavarini & Greer	27,000
J. M. Dunn	27,400
Baldwin & Peake	25,409
Noble H. Thomas	28,800

Proposals for constructing schoolhouse on southeast corner of Twenty-fourth and F streets NW., opened February 10, 1898.

Bidder.	Amount bid for building.	Amount bid for retaining wall.	Total.
J. M. Dunn	\$25,275.00	\$1,350.00	\$26,625.00
Gleeson & Humphrey	28,000.00	1,400.00	27,400.00
Baldwin & Peake	23,800.00	1,363.10	25,163.10
Pavarini & Greer	24,800.00	1,400.00	26,200.00
Geo. W. Harrison & Co.	25,240.00	1,500.00	26,740.00

Proposals for constructing an eight-room schoolhouse on Marshall street, Mount Pleasant, opened February 10, 1898.

Bidder.	Amount.
Andrew Gleeson	\$25,000
Jas. L. Parsons	27,978
Baldwin & Peake	27,266
Pavarini & Greer	25,000
J. M. Dunn	25,500
Geo. W. Harrison & Co.	27,147

Schedule of proposals to erect school building at First and Quincy streets, opened October 15, 1897.

Bidder.	Amount.
J. M. Dunn	\$28,800.00
Baldwin & Peake	27,000.00
Henry F. Getz	35,900.00
W. E. Speir	33,200.00
George W. Corbett	31,600.00
R. H. Hood	31,948.00
Andrew Gleeson and Robert T. Humphrey	28,000.00
Galloway & Son	33,857.56
C. Thomas & Son	30,300.00

Proposals for erecting an eight-room school building at First and Quincy streets, opened October 30, 1897.

Bidder.	Amount.
Andrew Gleeson and R. T. Humphrey.....	\$24,800
J. M. Dunn.....	25,200
Baldwin & Peake.....	24,633
C. Thomas & Son.....	24,711
James Connor.....	25,400
Pavarini & Greer.....	25,284

Proposals for constructing an engine house in Anacostia, opened August 13, 1897.

Bidder.	Proposal No. 1.	Proposal No. 2.
Justin McDonald.....	\$18,304.00	\$18,800.00
B. P. Bond.....	11,742.00	11,742.65
William Rothwell.....	16,000.00	16,700.00
D. F. Mockabee.....	15,349.00	15,836.00
C. Thomas & Son.....	17,999.00	18,200.00
Peter McCartney.....	16,900.00	17,100.00
J. M. Dunn.....	14,300.00	14,800.00
Connor & Cullity.....	18,564.00	18,864.00
Baldwin & Peake.....	16,397.00	17,017.00
Pavarini & Greer.....	13,549.00	14,049.00

Proposals for constructing an engine house on lots 5 and 6, square 431, Eighth street, between D and E streets NE., opened November 10, 1897.

Bidder.	Proposal No. 1.	Proposal No. 2.
Andrew Gleeson and R. T. Humphrey.....	\$10,740	\$10,600
James Connor.....	11,250	10,960
Pavarini & Greer.....	11,245	10,945
C. Thomas & Son a.....	10,363	10,063

a No certificate or certified check with the bid of C. Thomas & Son.

Proposals for constructing wagon shed and brick wall, and reconstructing stable in square 175, opened May 6, 1898.

Bidder.	Amount.
Pavarini & Greer.....	\$3,800.00
J. M. Dunn.....	3,977.00
Baldwin & Peake.....	4,300.00
Lane Brothers.....	4,385.00
N. H. Thomas & Co.....	4,512.00

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Proposals for hauling, opened June 26, 1893.

	Littlefield, Alvord & Co.	Merchants' Parcel Delivery Co.	The G. W. Knox Express.	J. Fred Spring- mann.	Richard Horn & Son.
For deliveries in the city of Washington:					
Sand (concrete and paving).....per cubic yard..	\$0.40	\$0.41	\$0.48		\$0.345
Screened gravel.....do.....	.40	.41	.48		.44
Paving bricks.....per M..	1.20	1.20	1.29		^a 1.00
Paving blocks.....do.....	1.70	1.70	1.90		1.48
6 by 20 inch granite curbing.....per linear foot..	.05	.05	.06		
8 by 8 inch granite curbing.....do.....	.04	.05	.05		
Cast-iron water pipe, valves, special castings, etc., per ton of 2240 pounds.....	.59	.55	.59	\$0.75	
For deliveries in the city of Georgetown:					
Sand (concrete and paving).....per cubic yard..	.50	.52	.58		.52
Screened gravel.....do.....	.50	.52	.58		.54
Paving bricks.....per M..	1.34	1.35	1.38		1.40
Paving blocks.....do.....	1.92	1.90	2.00		1.90
6 by 20 inch granite curbing.....per linear foot..	.05	.05	.06		
8 by 8 inch granite curbing.....do.....	.04	.05	.05		
Cast-iron water pipe, valves, special castings, etc., per ton of 2240 pounds.....	.79	.55	.59	1.25	
For deliveries in city of Washington, east of Eastern Branch:					
Sand (concrete and paving).....per cubic yard..	.40	.40	.58		.42
Screened gravel.....do.....	.40	.40	.58		.49
Paving brick.....per M..	1.32	1.30	1.38		1.39
Paving blocks.....do.....	1.80	1.80	2.00		1.50
6 by 20 inch granite curbing.....per linear foot..	.05	.05	.06		
8 by 8 inch granite curbing.....do.....	.04	.05	.05		
Cast-iron water pipe, valves, special casting, etc., per ton of 2240 pounds.....	.59	.55	.79	1.25	
For deliveries in county of Washington, between Eastern Branch and Rock Creek, not farther than 1½ miles from city limits:					
Sand (concrete and paving).....per cubic yard..	.50	.55	.64		.50
Screened gravel.....do.....	.50	.55	.64		.60
Paving bricks.....per M..	1.33	1.40	1.45		1.30
Paving blocks.....do.....	2.00	2.45	2.65		1.90
6 by 20 inch granite curbing.....per linear foot..	.05	.06	.06		
8 by 8 inch granite curbing.....do.....	.04	.05	.05		
Cast-iron water pipe, valves, special castings, etc., per ton of 2240 pounds.....	.79	.66	.79	1.25	
For deliveries in the county of Washington, west of Rock Creek, not farther than 1 mile from limits of the city of Georgetown:					
Sand (concrete and paving).....per cubic yard..	.50	.57	.64		.90
Screened gravel.....do.....	.50	.57	.64		.90
Paving bricks.....per M..	1.34	1.40	1.45		2.00
Paving blocks.....do.....	2.00	2.50	2.65		2.65
6 by 20 inch granite curbing.....per linear foot..	.05	.06	.06		
8 by 8 inch granite curbing.....do.....	.04	.05	.05		
Cast-iron water pipe, valves, special castings, etc., per ton of 2240 pounds.....	.79	.66	.79	1.25	
Additional haul. For deliveries at points other than described above (to be added to price for deliveries at nearest point described above):					
Sand (concrete and paving).....per cubic yard..	.10	.20	.10		.30
Screened gravel.....do.....	.10	.20	.10		.35
Paving bricks.....per M..	.20	.40	.20		1.00
Paving blocks.....do.....	.35	.70	.35		1.25
6 by 20 inch granite curbing.....per linear foot..	.02	.06	.02		
8 by 8 inch granite curbing.....do.....	.01	.05	.01		
Cast-iron water pipe, valves, special castings, etc., per ton of 2,240 pounds.....	.10	.10	.20	1.25	

^a Vitrified brick.

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